

# THE NATIONAL GEOGRAPHIC MAGAZINE

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## CONTENTS

	PAGE
THE VALUE OF ARCTIC EXPLORATION. BY COMMANDER ROBERT E. PEARY, U. S. N. . . . .	429
SURVEYING THE PHILIPPINE ISLANDS. BY GEORGE R. PUTNAM. ILLUSTRATED . . . . .	437
MUIR GLACIER. BY C. L. ANDREWS. WITH A NOTE BY G. K. GILBERT. ILLUSTRATED . . . . .	441
THE GRAPE-GROWING INDUSTRY OF THE UNITED STATES. ILLUSTRATED . . . . .	445
PRECIOUS STONES. ILLUSTRATED . . . . .	451
NOTES ON PANAMA AND COLOMBIA. ILLUSTRATED . . . . .	458
THE U. S. SIGNAL CORPS . . . . .	467
DAVIDSON'S BOOK ON "THE ISLAND OF FORMOSA." ILLUSTRATED . . . . .	468
GEOGRAPHIC LITERATURE . . . . .	471
NATIONAL GEOGRAPHIC SOCIETY . . . . .	474
INDEX TO VOLUME XIV . . . . .	475

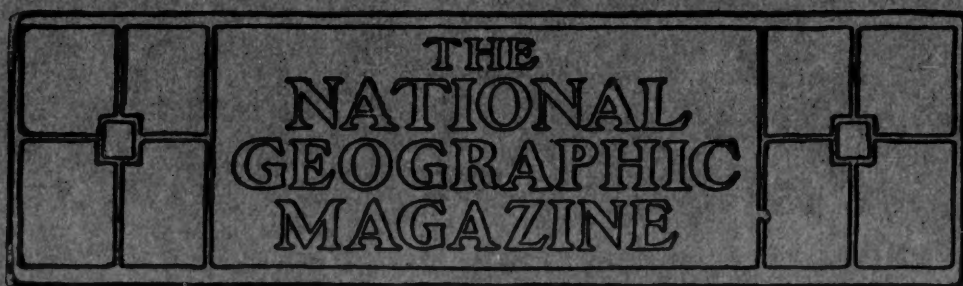
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# THE NATIONAL GEOGRAPHIC MAGAZINE

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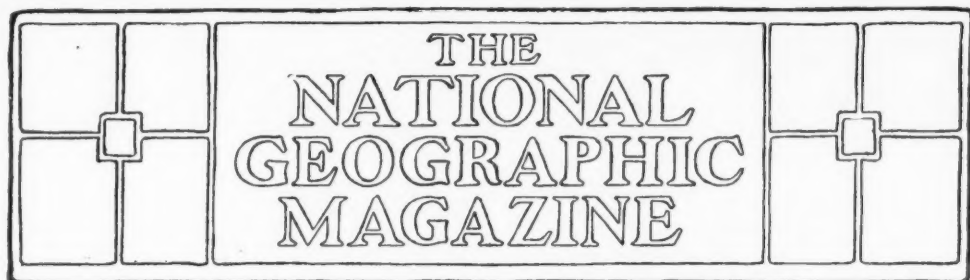
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WASHINGTON, D. C.



## THE VALUE OF ARCTIC EXPLORATION\*

BY COMMANDER ROBERT E. PEARY, U. S. N.

**I**T is entirely appropriate that the first public exposition of the present phase of Arctic exploration and my own plans for the coming season should be given in the National Capital and under the auspices of the National Geographic Society. It is unnecessary for me to note here the continued and unflagging interest in and courtesy toward my Arctic work which has been shown by this Society during the past twelve years. You are well aware of it; I am well aware of it.

I shall endeavor to place clearly before you tonight the plan of my campaign, and the means by which I hope to accomplish the object which you all know that I have before me. I hope that I may be fortunate in sending every one of you away with definite ideas, which will enable him or her to keep in touch with events as they materialize during the next two or three years.

### EARLY PROGRESS OF DISCOVERY

Before taking up present plans, let us go back a bit. Some forty-five centuries ago the known world lay within a little circle whose circumference touched

the Black and Caspian seas, the head of the Persian Gulf and the Red Sea, and the eastern end of the Mediterranean. Centuries later the fearless Phœnicians had dared the terrors of the infinite ocean which lay beyond the Pillars of Hercules, and sailed along the coasts both north and south. East they had pioneered the way to India. The fabled voyages of Ulysses and Jason dwindle beside their splendid distances. Still later came the work of the great explorer-conquerors, Alexander and Cæsar, opening up far-distant lands as the Phœnicians opened up far-distant seas.

Then came that great burst of exploration, the principal facts of which we know so well. Vasco de Gama to the south; Othere and the Vikings to the north; Erik and Leif, Columbus and Cabot to the west, lifted Africa, the northern headlands of Europe, and the western world from the mists.

Magellan, following close upon their heels, circled the globe, and the world, as we know it now, lay revealed in its rough, broad masses.

Since then exploration has, of necessity, been a work of large details, baring

\*An address before the National Geographic Society, October 24, 1903.

the hearts of continents, and pushing northward and southward, till today only the northern and southern apices of the earth still hide in the mists and gloom of the polar nights.

A little less than four centuries ago the first expedition started out toward the North Pole. Since that time, with periods of greater or less intensity, practically all the civilized nations of the earth have made attempts to reach that charmed spot.

Millions have been expended in the efforts, and, though they have brought back information and accessions to scientific knowledge which have fully repaid the expenditures, the main object remains still unattained. The ablest writers, scientists, geographers, statesmen, and rulers have been interested in the matter, and have urged the prosecution of the work with all the eloquence at their command. Many of their remarks upon the subject have become historic.

#### THREE NORTH POLAR ROUTES

As a result of all these explorations extending through nearly four centuries, the possible routes to the North Pole have dwindled to three. In my own personal opinion, they have dwindled to two, but I note the three. First, the drift method as devised, inaugurated, and put into execution by Nansen. The possibilities of this method are acknowledged by every one, but it by no means follows that another ship, or even the *Fram* herself in a second attempt, would be as fortunate as she was in the first voyage. Again, it requires a man of exceptional temperament and a crew of almost superhuman qualities to undertake a voyage which means that for four or five years at least ship and people are but a helpless bit of flotsam entirely at the mercy of the ice in which they are drifting and practically unable to control their own fortunes or contribute by their efforts

to success. Presumably Nansen and Sverdrup are advocates of this route; yet neither has, to my knowledge, expressed a desire to repeat the experience of the *Fram's* voyage. Bernier is reported as contemplating a repetition of the voyage.

The second route is the so-called Franz Josef Land route. Wellman, Baldwin, and Mr Ziegler are advocates and adherents of this route. If there are others, I do not recall them at present.

Payer and Weyprecht, Leigh Smith, Jackson, Wellman, Abruzzi, and Baldwin have all exploited the Franz Josef Land route with greater or less success. Of these various expeditions, however, Abruzzi's is the only one that has succeeded in pushing beyond the northern limit of the Franz Josef Archipelago. He is not at all in favor of this route. In fact, he uncompromisingly advocates, in words I shall quote to you later, the third—the Smith Sound, or "American" route.

#### PLANS FOR COMING EXPEDITION

To come down to the present, I assume that all of my hearers are familiar, in a general way, with what I shall attempt to do and how I shall attempt to do it, but I have noticed so many misapprehensions as to details on the part of otherwise well-informed people, that I feel a brief exposition of certain points may not be out of place.

I plan to take two ships—one a steamer with engines of maximum horse-power and minimum weight and bulk, and an auxiliary vessel to carry coal. With the steamer I plan, in the summer of 1904, to push up Smith Sound, Kennedy Channel, and Robeson Channel, and then to station her for the winter on the north coast of Grant Land, carrying her, if possible, farther north than the *Alert* or the *Polaris*. If she can get me as far as that, I do not care what becomes of her—she will



have served her purpose of getting me to 82° 50', Cape Joseph Henry, which will be my base of action. The second vessel will carry a large freight of coal, which will be landed on Grant Land, near the northern entrance of Robeson Channel. With this reserve of coal I will not have to economize the fuel of my steamer, but can keep the furnaces and engines going at utmost tension through the ice. The reserve will also be there to take my steamer back after her work is done, if she is still alive. From Cape Joseph Henry the march toward the Pole will begin in 1905. The distance from this point to the Pole and back again is less than the average distance of my four sledging trips in 1892, 1895, 1900, and 1902. There is no reason why I should not equal this distance on my next sledging trip, thus gaining the Pole and getting back again in one season of 100 days. I shall take my Eskimos with me to my northern base.

On my return to Cape Joseph Henry after the polar dash, I plan to return in my steamer from that point if conditions are favorable. If the ice is impenetrable or my steamer is unable to carry me, I shall proceed by land southward to Cape Sabine, over the route which I laid out and which I have traveled so often in the past. At Sabine my auxiliary vessel would meet me and bring me home.

The principal departures in my new plan are: First, using a powerful steamer to force my way through the ice, instead of a sailing ship with auxiliary engines; and, second, making my base on the shore of the Polar Sea, more than 200 miles north of my previous base at Cape Sabine.

Abruzzi's remarks upon the subject of the attainment of the Pole are particularly valuable as well as extremely interesting. His words are given in full:

"It would be useless to repeat the attempt (of reaching the Pole) by follow-

ing the same plan (the route from Franz Josef Land). It would, at most, be possible to push a few miles farther towards the north if the ice of the Arctic Ocean was in an unusually favorable state; but the results would not afford any compensation for the fatigue and privations undergone. While following, therefore, the invariable plan of setting out from some point on land, and not from a ship drifting on the ice, on account of the reasons put forth in the first chapter of this work, it will be necessary to find some other method of shortening the distance which has to be traveled with sledge. What I should recommend would be to sail along the western coast of Greenland to the north of Kennedy Sound, where it ought to be possible, under favorable conditions, to go to a still higher latitude than that reached by the *Alert* off Grant Land."

This is the plan of campaign which Assistant Secretary Darling has been pleased to commend, and for the execution of which he has granted the necessary leave. This is the plan which has the approval and sympathy of President Roosevelt.

Assistant Secretary Darling, in granting leave for the purpose of this expedition, has continued the traditions of the Navy Department, and has associated himself with Dobbin, Kennedy, Robeson, and Chandler, all of whose names are inscribed on our Arctic charts. He has also put himself in line with a long list of British Lords of the Admiralty, who have seen the moral as well as the material utility of Arctic exploration, and have fostered and encouraged it with all the means at their command.

President Roosevelt, in expressing his sympathy and approval of the work (as was naturally to be expected from his big, active temperament), associates himself with a long list of illustrious names in the past—Ferdinand of Spain, Charles V, Henry VII, Elizabeth, etc.,

all patrons of exploration. He has also abundant company among foreign rulers of the present time. The expeditions of Scott, Drygalski, Nordenskjöld, Nansen, Sverdrup, and De Gerlache have had respectively the strong personal support and approval of Edward of England, William of Germany, Oscar of Sweden and Norway, and Leopold of Belgium. Charcot's French expedition has the lively support and approval of President Loubet.

It may possibly interest you to know that up to the present time editorial comment from over 500 different newspapers throughout the country have come to my eye, and there is not a hostile note among them; but two or three points have been brought up in these notices which it may be well to touch upon briefly. I do not speak of them in a captious mood, but with a desire to set the points straight.

One is the statement of the President of the Royal Geographical Society of London, that "after Nansen's voyage, there is no longer any geographical object in going to the North Pole, except for the sake of deep-sea soundings, for it is merely a point in the polar ocean, the economy of which has been made known by Nansen. That great explorer finally removed the veil which concealed the secret of the Arctic regions."

The President of the Royal Geographical Society is a strong personal friend of mine, but I cheerfully disagree with him on some points, and particularly the one which assumes that we have practically reached the North Pole, and, in substance, know all that is necessary to know about it. I have never been entirely in sympathy with the claims put forth immediately after Nansen's return from his voyage in the *Fram*, that he had practically reached the Pole; that we now knew everything that it was necessary to know in regard to that region, and that any further efforts were not worth while.

A distance of 260 miles from the Pole is a long ways from the actual attainment of the Pole, and to assert that the secret of the Pole has been penetrated and the veil lifted, at a range of 260 miles, and that the economics of the polar basin have been revealed, when 3,000,000 square miles of it have not been trodden by human foot or seen by human eye, is an enthusiastic view.

#### ERRONEOUS THEORIES OF EXPLORERS AND GEOGRAPHERS

There is no portion of the earth's surface where it is more distinctly impossible to prophesy or forecast what is beyond the horizon of actual vision than in the Arctic regions. The truth of this statement has been most strikingly exemplified in the past.

In 1818 Sir John Ross made a voyage to Baffin Bay, and returning reported that body of water to be a closed sea. To the westward, at the head of an inlet which he called Lancaster Sound, he showed on his chart a striking range of mountains.

A few years later Parry entered the Sound, and before a favoring wind went spanking away to the westward beyond the hundredth meridian, and never saw these mountains. Later explorations showed the great inlet of Smith Sound extending, as we now know, to the central polar basin, and Jones Sound penetrating far to the northwestward, also leading from this "closed sea."

Again it was conclusively determined theoretically, by geographers, that the interior of Greenland was a fertile, or at least an ice-free country, surrounded by an ice barrier near the coast. Further explorations show the interior to be absolutely and completely buried under an enormous ice-cap.

Kane and Hayes stood upon the shores of the open polar sea, as they supposed; yet that open polar sea has not only retreated but absolutely disappeared before the footsteps of subsequent explorers.

Petermann, one of the greatest of geographers, proved conclusively, in a theoretical way, that Greenland was one extremity of a great Arctic continent extending across the Pole, and Wrangel Land the other. Later the *Corwin* determined Wrangel "Land" to be an almost insignificant island of contracted dimensions, and we know now that Greenland ends 450 miles short of the Pole.

For years Franz Josef Land was supposed to be the southern extension of an Arctic continent, yet the *Fram* drifted across its meridian north of it, seeing no land; so the instances could be duplicated.

As a matter of fact, there may be land within 30 miles of Nansen's or Abruzzi's farthest, and yet neither of them the wiser for it. Until we reach the Pole no one can say what there is there, whether land or water.

In the light of these facts, it appears that one man's views are as good as another's, assuming the men to be of equal intellectual caliber.

I feel, therefore, that the opinions of Assistant Secretary Darling are entitled to as much weight as those of Sir Clements or other geographers. To a careful and enthusiastic study of Arctic voyages, extending over a number of years, Judge Darling brings deep thought, clear perception, exceptional ability, and the judicial bent of long legal training. He is strongly impressed with the great probability of finding land in the central polar basin.

For myself, as a practical worker in the field, taking what I find rather than theorizing as to what I ought to find, I recognize fully this probability; and that I have not urged it—in fact, have leaned the other way—is due to the confirmed pessimism which long years of Arctic work and disappointments have taught me—pessimism as to any conditions which will simplify or render easier the work I have laid out for myself.

The existence of land anywhere between the northern shore of Grant Land and the Pole would so greatly simplify my work and reduce its difficulties that I do not let myself dwell upon it. But the possibility is there; an isolated island and continent, an Arctic Atlantis, with a fauna and flora of its own, with one day and one night in the year, lying there through the blinding days and opaque nights of countless geologic ages, as completely isolated from the world as if it were on Mars.

Think of the satisfaction of lifting such a land out of the heart of the polar sea with the Stars and Stripes of "Old Glory." Think of writing upon that land some name to endure indelibly till that day when "the heavens shall wither like a scroll," to show forever that we own the top of the earth. Believe me, there is room yet in this prosaic world for a new sensation.

#### NORTH POLE THE LAST GREAT GEOGRAPHICAL PRIZE

My statement that the North Pole is the last great geographical prize which the earth has to offer has also been criticised in some quarters, and it is claimed that it is nonsense to say that the North Pole is a greater prize than the South Pole. I repeat advisedly that the North Pole is the last great geographical prize which the earth has to offer.

That the particular mathematical point of the North Pole possesses greater interest or value than the South Pole is not asserted, but the North Pole is that apex of the earth which is in the center of the hemisphere of civilization. The North Pole has been sought by men for nearly four centuries; the South Pole for less than a century. The North Pole has a striking place in history, in literature, in poetry, in romance. It has been the subject of infinite speculation, and, finally, when the North Pole has been attained, the attainment of the South Pole will follow naturally and rapidly and will attract much less attention.

In this connection it is well to note also a popular misconception, namely, that the attainment of the South Pole is more difficult than the attainment of the North Pole. This is not so. In spite of the close approximation to the North Pole by recent expeditions, the actual attainment of the North Pole is a very different proposition from the attainment of the South Pole and much more difficult. The conditions are almost diametrically opposite. In the case of the North Pole it is a polar sea which must be traversed and conquered. In the case of the South Pole it is a polar land which must be traversed and conquered. In the light of recent explorations, the region about the South Pole offers facilities for the realization of the favorite popular ideas of attaining the Pole, namely, the colonization method, the method of relay stations short distances apart connected by wire, etc., etc. Plans of colonization, of relay stations, of telegraph connections, etc., etc., fall to the ground in the North Polar region because of the impossibility of effecting anything of this kind upon the moving ice pack of the central polar sea.

The attainment of the South Pole, granted sufficient funds, is only a matter of time and patience. The work can be carried on in any season of the year, and each mile of advance can be permanently secured.

The attainment of the North Pole means the ability to so refine and perfect one's equipment, supplies, and party as to be able to cover a distance of 500 miles each way without caches and without support from the country, and to cover this distance in a time limit of three or at most three and one-half months.

#### FUNDS FOR THE EXPEDITION

A partially erroneous statement has been generally disseminated which I am glad of the opportunity to correct here.

It is to the effect that the Peary Arctic Club will furnish the funds necessary to send out the proposed expedition. This is true only to a certain degree.

The Peary Arctic Club, an unincorporated association of my personal friends, with Morris K. Jesup, of New York city, at its head, furnished the funds for the financing of my last four years of Arctic work. After my return last fall there was a general feeling of disinclination to drop the work uncompleted, when success had been so nearly won. This feeling took form in the proposition of the majority of the club to contribute in varying sums toward the outfitting of another expedition. Unfortunately, however, the total amount which these members of the club felt they could contribute, even with the accession of some new members, was not sufficient to properly fit out an expedition. Had it been sufficient I should have gone north last summer, and should now be settled down in winter quarters somewhere on the Grinnell Land coast.

The same status holds today. The total amount which the continuing members of the Peary Arctic Club feel that they can contribute to another expedition is insufficient to properly outfit the expedition. Additional members, either individuals or associations, are necessary to complete the total amount.

And it is to be said in this connection that it is essential that the total amount should be assured without delay; \$150,000 to \$200,000 between now and the 1st of January will meet all requirements and give ample time to properly fit out the expedition. Six months from now it will be impossible to fit the expedition even with a half-million available, because of lack of time.

Somewhere in this broad country I am satisfied that the money is waiting, ready and anxious to do this work as I, if only the connection can be estab-



lished. One thing is to be clearly understood, the government is not financing the work. The funds must come from private sources.

It may be said without egotism that a practical experience equaled by that of no other worker in Arctic regions; an interest in the work at least equal to that of any other man; the utmost assistance of the Eskimos, never before available; the time and the opportunity, thanks to Assistant Secretary Darling and the President—all these are assured; the only thing lacking is the money.

I assume that if it were demonstrated that the erection of a monument costing \$150,000 would redound to the great credit of its builder or builders and of the city wherein it stood, not only now, but for generations to come, it would not be a very difficult proposition to secure that amount from some public-spirited citizen or citizens in many a prosperous city in this country.

The Pole is a grander monument than any structure of stone or bronze, and a name inscribed upon it would be read and known by future generations when granite and bronze had crumbled to dust and rust.

There is no way by which a man of large means may win for himself in these days a more enviable and lasting name than by assuming the rôle of patron of some large effort to increase our knowledge of the earth.

The principal thing we remember of Ferdinand of Spain is that he sent Columbus to his life work.

All that most of us remember of Grinnell, of New York, is that he sent Kane to his work.

To the millionaire, whether he be young and just starting in life, or elderly and retired from business, it offers a broad and elevated field.

In the words of old Martin Frobisher, it is "the one thing left of this world by which a notable mind may become famous and fortunate."

#### CONQUEST OF THE POLE SIMPLY A BUSINESS PROPOSITION

The conquest of the Pole is today a business proposition, pure and simple; and, like any business proposition, it can be presented in three sentences of four words each. Can it be done? What will it cost? Is it worth while?

*Can it be done?* There is not a geographer, a scientist, or an intelligent person conversant with Arctic matters who doubts that the Pole *can* be reached, and that it *will* be reached in a few years.

The requirements are simply those for any large project; sufficient money; proper equipment; adequate time; energy, experience, and determination.

*What will it cost?* The cost of various Arctic expeditions has ranged from a few thousand to a million dollars each.

On my plan, and with my methods, an expedition which would in all probability secure the Pole, can be fitted out for two years at a cost of \$150,000. The only expensive item in that outfit will be a powerful ship which shall push me to the northern shore of Grant Land.

There are hundreds of men in this country today who could defray the expenses of an expedition and never feel it; thousands who could defray a tenth, hundreds of thousands who could defray a hundredth.

We have spent and are spending hundreds of thousands of dollars for an idea or a principle.

Take a single example, the international yacht races. A reliable New York paper stated recently that the cost of the last yacht race to the American side alone was in the neighborhood of \$900,000, and that it has cost us to defend the cup in the last five years some \$2,200,000.

For less than one-fourth of the former sum, less than one-tenth of the latter, we can secure the Pole.

And how do the races compare?

The races for the America's cup have been in progress for tens of years, be-

tween two nations; the race for the Pole hundreds of years between practically all the civilized nations of the world.

There have been numbers of cup-defender syndicates, and will be numbers more.

The syndicate that lifts the Pole will have no successor and can never be beaten.

The winning of the yacht race is a matter of today; the winning of the Pole is for all time.

*Is it worth while?* Certainly it is worth while.

As a matter of the valuable additions to geography and science it is worth while.

The head of the Smith Sound route is the one point from which can be reached and welded the links still lacking to make the Arctic exploration a finished job.

#### THE MORAL PRESTIGE OF GAINING THE POLE WORTH TEN TIMES THE COST

As a matter of prestige it is worth while.

Abruzzi's expedition, costing two hundred thousand dollars, was worth many times its cost to Italy in increased prestige.

Abruzzi drove home to the civilized world the fiber of which Italians are made.

Nansen's expedition, fitted out by his King, his Parliament, and wealthy private citizens, impressed the world with the material which makes up the descendants of the Vikings.

And should *you* some morning read in your paper that an American had placed the Stars and Stripes upon the Pole, each one of you would feel a thrill of pride and enthusiasm, and be glad that you are an American; and every true American at home and abroad would feel the same pride, and that increment of justifiable pride and enthusiasm to each of millions of citizens

would be worth ten times the cost in dollars and cents.

As a matter of patriotism based upon the obligations of our manifest destiny, it is worth while.

The North American world segment is our home, our birthright, our destiny. The boundaries of that segment are the Atlantic and the Pacific, the Isthmus and the Pole. We are fully able, I think, to take care of the Atlantic and the Pacific. We are negotiating for the Isthmus. It would be a shame for others to find and mark the Pole for us.

Believe me, the winning of the North Pole will be one of the great mile-stones of history, like the discovery of the New World by Columbus and the conquest of the Old by Alexander; and the man, or the association, or the community, or the nation that makes its discovery possible will write its name to be read and known when, perhaps, the very civilization of today is forgotten.

Let us attain it, then. It is our privilege and our duty. Let us capture the prize and win the race which the nations of the civilized world have been struggling for for nearly four centuries, the prize which is the last great geographical prize the earth has to offer; the race which is far greater than the international yacht races. Then let us take a hand with England, Germany, Sweden, Scotland, and the others for the conquest of the South Pole. As Assistant Secretary Darling well says, the attainment of the Poles is all that remains to complete man's domination of the earth.

Six years ago we were sleeping content within our borders, drowsy of our strength and possibilities. Since then we have embraced the earth, and now right hand clasps left in the far East in a grasp never to be loosened. What a splendid feat for this great and wealthy country if, having girdled the earth, we might reach north and south and plant "Old Glory" on each Pole. How the imagination stirs at the thought!

# SURVEYING THE PHILIPPINE ISLANDS

BY GEORGE R. PUTNAM,

ASSISTANT, UNITED STATES COAST AND GEODETIC SURVEY, IN CHARGE OF  
WORK IN THE PHILIPPINES

THE work of the Coast and Geodetic Survey in the Philippine Islands is at present conducted under a joint arrangement between the national and insular governments, whereby each defrays certain classes of expenditures. It is under the general supervision of the Superintendent at Washington, but the local administration is conducted mainly through a sub-office established at Manila. In all relations with the Philippine government this office acts as a bureau reporting to the Philippine department of commerce and police, in accordance with the act

of the Philippine Commission passed September 6, 1901.

An officer of this survey visited the islands during the summer of 1900 to make a preliminary investigation of the need of and conditions for the carrying on the work of the organization. The first survey parties arrived in Manila in December, 1900, and the present office quarters in the Intendencia building were assigned and field parties commenced work in January, 1901. At that time active military operations were in progress throughout the islands and Manila was under martial law. No one



Surveying Party Crossing a River on an Improvised Raft



Landing from an Outrigger through the Surf

was allowed on the streets of the city after 10 o'clock at night without authority, so that it was necessary for the longitude observer to be provided with a pass. For a while the field work was confined to the vicinity of garrisoned posts, but after a few months the general conditions in the islands greatly improved and survey operations have been extended as needed. No serious difficulty has been encountered because

of the hostility on the part of the natives, although in instances parties have been in towns that were "shot up." On several occasions the surveying work, and especially the triangulation signals, have aroused the suspicions of over-zealous local officials. In one instance an observer climbing a hill to occupy a triangulation station met the municipal police of the neighboring town coming down the hill carrying the



triangulation signal with its wide, out-spreading legs still on it; they were industriously cutting a wide path through the thicket so as to be able to produce this suspicious object intact, evidently believing it a beacon of the insurrectos. They were persuaded to carry it up the hill again.

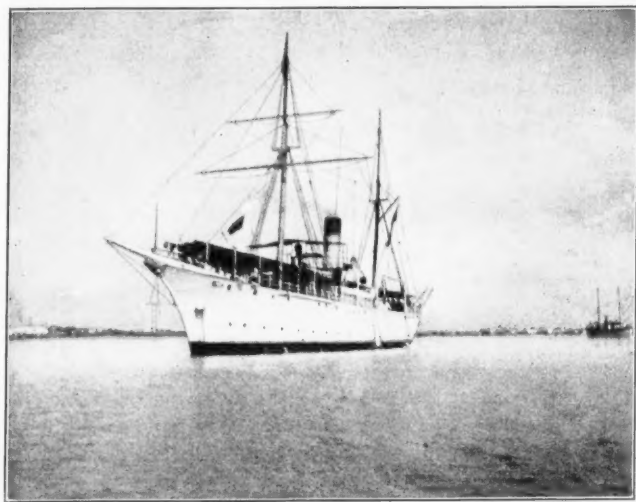
The development of the field work has necessarily been controlled by various conditions, and it has been extended along the lines which appeared most feasible with the means available and most likely to yield results of immediate usefulness.

The wide extension by the Signal Corps of the telegraph system for military purposes suggested the determination of base positions, including telegraphic longitudes and zenith telescope latitudes. It was fortunate that this work was carried out promptly, as with the passing of military necessity many lines have been abandoned. Thirty-six latitudes and thirty-six differences of longitude have been determined, the points being fairly well distributed over the archipelago from the north coast of Luzon to Zamboanga. These stations have all been marked and described for future reference. At most stations a meridian has been laid out or an azimuth measured, and magnetic observations have generally been made.

The surveying steamer *Pathfinder*, under command of J. J. Gilbert, assistant, U. S. Coast and Geodetic Survey, arrived at Manila from Alaska in November, 1901, and has since been continuously at work in the islands, except during intervals when docking or repair work on the vessel has been required.

Harbor surveys at Cebu, Ormoc, and Romblon have been made, and during the past year this vessel has completed important surveys of San Bernardino Strait and Albay Gulf, and of San Pedro Bay and the south coast of Samar, as well as a thorough examination of the much-used passage southwest of Leyte, where a danger had been reported. The *Pathfinder* is a well-equipped, modern survey ship, and carries two steam launches.

A small wooden steamer was pur-



U. S. Coast and Geodetic Steamer *Pathfinder*

chased in Manila and adapted to survey work. This vessel, the *Research*, has made a number of harbor surveys on the west and southeast coasts of Luzon and on Mindoro and Culion islands, and is at present working on the coast of Negros.

Chartered launches have been employed in some cases for hydrographic work, and the survey of Lingayen Gulf by this means has recently been completed. Harbor surveys have been made at a number of other places, using various means.

The abrupt coral reefs along many of

the coasts of the archipelago materially increase the difficulty of carrying on hydrographic work.

In connection with the hydrography, tidal observations have been made at 31 places. At Manila an automatic tide-gauge has been maintained for more than two years. The tide staffs are referred to bench-marks. The tide records are used in reducing the soundings and in predicting the tides, to be included in the annual Tide Tables published in Washington.

A continuous triangulation has been carried along the northwest coast of

extend to the southward among the islands.

Topographic surveys with the plane-table have been carried out in connection with nearly all the other work, usually executed simultaneously with the triangulation, but controlled by the latter. A scale of  $\frac{1}{10000}$  has generally been used for harbor work and  $\frac{1}{20000}$  for general coast work, though these have been varied as conditions required. The topography has been confined to the shore line and adjacent towns and highways, with the location of elevations visible from the coast. In the



Triangulation Party Starting Out from Manila

Luzon from Lingayen Gulf to Cape Bojeador, and this is now being extended eastward along the north coast. This triangulation is for the control of the coast line, and extends from the shore to the first line of hills. It is joined to the various astronomical stations and is sufficiently controlled by base lines and observed azimuths. Nearly all the harbor and other survey work is based on triangulation, and is generally connected with one of the astronomical stations, and all the points are marked and described. A triangulation has been carried to the entrance of Manila Bay, which it is proposed to

work along the northwest coast of Luzon native ponies were used by the observers, and bull carts for the transportation of instruments. The work progressed satisfactorily under the conditions there found, which were more favorable than in many other districts. The numerous substantial church edifices with which the country is dotted furnish the best of artificial landmarks and are a decided assistance in all parts of the survey work. In some localities few additional signals are necessary for hydrographic or other work.

In the office of the Survey in Manila detailed plans for the field parties are

arranged, the distance from Washington rendering this necessary. The records and survey sheets are sent to this office, and preliminary charts are prepared and published by lithography in Manila.

In this office there have also been compiled and published a series of seven pamphlets of Sailing Directions for the Coasts of the Philippine Islands, and from time to time there are published Notices to Mariners, giving new information of immediate importance to navigation, as dangers discovered, changes in aids to navigation, and other corrections to charts.

The computations are revised and carried as far as may be needed for immediate use, the soundings are plotted or examined, and the drawings are reduced to the scale required for publication. Besides the American experts in charge of each part of the work, ten Filipino draftsmen and one Filipino computer are employed. The almost entire lack of technical education in the Philippines has been a barrier to testing the ability of the natives in the survey work in the field.

To furnish a knowledge of the coasts

and adjacent waters that will be satisfactory to an enlightened nation will require a large amount of coast-survey work in the Philippine Islands. While considerable information exists, a careful examination of it proves that for only limited areas does it approximate completeness. Many parts of the coast have been only roughly sketched. A glance at the map of the islands shows that the natural highways of this region are on the water, so that a large part of the commerce of the islands will always be carried by water. A few geographical facts will emphasize these conditions. The islands have a general coast line of about 11,444 statute miles, or double that of the main part of the United States, while the total area is 115,026 square miles, or less than that of New Mexico. There is a mile of coast line to every 10 miles of area, while in the United States the proportion is 1 to 555. There are nearly 1,700 islands having names and it is possible to count 3,000 islands and islets on the charts. Even the larger land masses are so elongated in figure that no point in any island is more than 60 miles distant from some part of the coast.

## MUIR GLACIER

FOR four years it has not been possible for the excursion steamers visiting Glacier Bay to closely approach the Muir Glacier. As that glacier has been the Mecca of many of the Alaska tourists, the failure to see the glacier at close quarters has been a grievous disappointment. During the season of 1899 the conditions were unchanged, and the boats made their entrance into Muir Inlet and landed their passengers as usual, but with the season of 1900 and the following seasons they were able to get no nearer than from five to ten miles below the usual

landing. From that distance it could be seen that great changes had occurred in the appearance of the front of the glacier, and that the ice had receded to a considerable extent.

Desiring to know the extent of the changes, on May 5, 1903, Mr Case, a photographer, of Skagway, Alaska, and myself left Skagway for Glacier Bay in an open boat. We followed in the bay, in all probability, close on the track of Professor Muir and Reverend Young when on their exploration trip in 1879. Going through the passages between the Beardslee Islands and keeping near



A. Muir Glacier in May, 1903

A and B give a panoramic view of the frontal cliff of the division of the glacier passing east of the nunatak. Beyond the nunatak at the left appears a part of the main or western division

the east shore, we entered Muir Inlet, passed back of the small island, and reached the moraine of the glacier. At this point the ice completely blocked further progress, filling the inlet from shore to shore in a solid mass of bergs, large and small. Landing here, we went up to where a view could be had of the inlet and glacier. From this point the ice in the inlet looked as though so closely packed that, from the island on the eastern shore across to the western shore and up to the front of the glacier, one might cross the inlet on the ice at almost any point. At scarcely any place could any water be seen, and to one not knowing that water extended underneath the ice, it would have been

hard to believe it possible. It had the appearance of a great ice-jam in a river, except that the larger bergs were lifted above the mass higher than any jam could raise them. The space of clear water which formerly extended in front of the ice, forming one of its greatest contrasts, was entirely filled.

The glacier had receded until the point of the island in the center of the glacier, shown as being about three miles from the ice-front on the map of the glacier by Professor Reid, in the NATIONAL GEOGRAPHIC MAGAZINE, February, 1892, was clear of ice except such as lay on the water in front of it. The main branch breaks from there to the mountain at the west, and





B. Muir Glacier in May, 1903

the western tributary is entirely separated from it. On the other side of the island, or nunatak, the break of the glacier front extends toward the mountain above the Dirt Glacier in two hollowing curves, leaving a point in the middle extending into the inlet as though resting on a sand-spit or other support. From there it turns west toward the Dirt Glacier and presents an ice-wall of perhaps 100 feet in height or more, nearly to the place the Dirt Glacier enters the inlet. This part of the glacier presents a different front from the main branch. The top of the ice is nearly level, and as it approaches the water it cracks in immense crevasses at varying distances back, and cubical blocks break from it, making much

larger bergs than were formerly thrown off by the Muir. Bergs that appeared to us to be fully 75 feet out of the water were seen 10 miles down Glacier Bay.

The Dirt Glacier pushes its black front out into the inlet from the southeast, forming a separate glacier.

This description will enable any one familiar with Professor Reid's map, or any one who has visited the glacier, to understand the marked changes which have occurred.

Judging from the appearance, it is not improbable that the end of the career of the Muir as a tidewater glacier is near at hand.

Many attribute the sudden changes to the earthquakes which occurred in

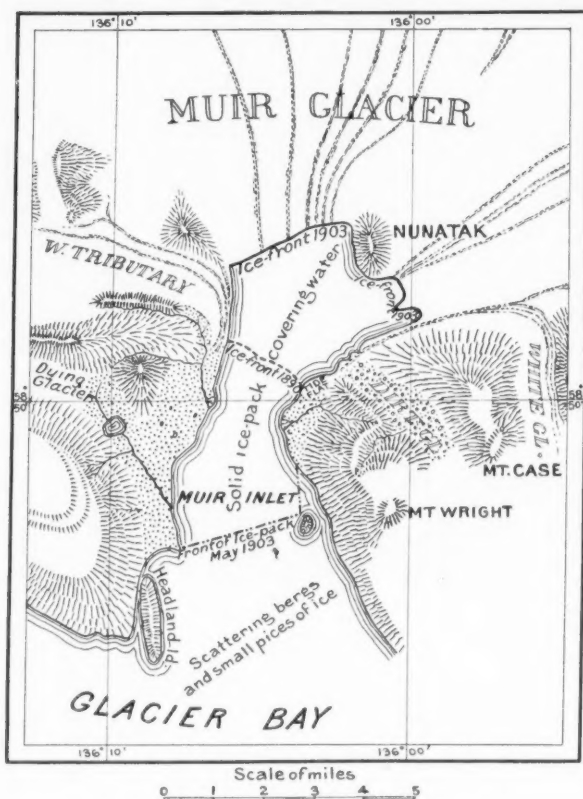
September, 1899. At that time the part of Alaska in which the Muir Glacier is situated was visited by several severe shocks of earthquake. Previous to that the steamers had experienced no great difficulty in landing their passengers within a short distance of the front of the glacier, but during no season since have they been able to get nearer than five to ten miles, owing to the immense quantities of floating ice. Instead of receding a mile in seven years, as has

been estimated heretofore, it has drawn back about two and one-half miles since 1899; consequently, to assign the changes to that cause is not at all unreasonable.

I append a sketch, based on Professor Reid's map heretofore referred to, showing changes, and also photographs by Mr Case and myself, showing some of the existing conditions.

C. L. ANDREWS.

Skagway, Alaska.



Sketch Map of Muir Inlet and Front of Muir Glacier, Showing Positions of the Ice Front in 1890 and in May, 1903

The main features are taken from the map published by H. F. Reid in volume IV of the NATIONAL GEOGRAPHIC MAGAZINE. The ice front in 1903 and the data as to the condition of the inlet in that year are by C. L. Andrews.

#### NOTE BY G. K. GILBERT

THE Muir Glacier is the best known and also one of the most interesting of American glaciers. It is not a narrow river of ice of the ordinary alpine type, but rather a broad lake of ice fed by tributary streams from many directions, and discharging through an outlet valley to Glacier Bay. The bottom of this valley of discharge is below sea-level, so that whatever position in it the glacier front occupies the ice is washed by the water of the ocean. The part of the valley not occupied by the glacier is known as Muir Inlet, and is a branch of Glacier Bay. In 1792, when this part of the coast was mapped by the English navigator, Vancouver, nearly the whole of Glacier Bay was filled with ice, the Muir Glacier being tributary to a broader stream. This broader stream ended in an ice cliff at a point more than 20 miles farther seaward than the present front of Muir Glacier. In 1879 the region was visited by John Muir, who explored Glacier Bay and its various inlets. He found the front of Muir Glacier well within Muir

Inlet, the retreat since the time of Vancouver having been more than 15 miles. In 1886 Rev. G. F. Wright made a study of the glacier, and it was surveyed and more elaborately studied by Prof. H. F. Reid in 1890 and 1892. In 1899 it was visited by the Harriman Expedition, and changes in the outline of the front were recorded in a sketch map by Mr Henry Gannett. Each successive observation up to 1890 showed the retreat of the ice front. Between 1890 and 1892 there was a slight advance, and there was a moderate amount of retreat before 1899. The history of the locality since 1899, as set forth in Mr Andrews's letter, indicates that some very important change was made by the earthquake which occurred a few months after the visit of the Harriman Expedition. As the amount of ice thrown into the inlet was so great that approach by water is not yet possible, it is probable that the greater part, or perhaps the whole, of the falling away of the glacier front took place suddenly and as a consequence of the earthquake. Professor Reid's map shows two nunataks, or islands of rock, projecting above the glacier a few miles

back from the front. The summits of these nunataks were used by him as topographic stations, and they were afterward occupied for the same purpose by Mr Gannett. I also, as a member of the Harriman Expedition, visited them in 1899, and noted that the portion of the glacier lying between them and the ice front was at that time practically stagnant. The portion between them and the east wall of the basin seemed also to be nearly motionless, but there was evidence of a strong current west of the nunataks. That which has since broken away includes portions of both the inactive and the active divisions of the glacier, and the maps and photographs suggest that the ice in the vicinity of the nunataks has suffered loss in depth as well as area. Where Reid mapped two small nunataks, Gannett found two of larger area, and Andrews indicates a single one, including the positions of both those observed by Reid. The retreat of the ice front has extended practically to the face of the confluent nunatak, though a remnant of ice appears to cling to the rock, forming a terrace about its seaward slope.

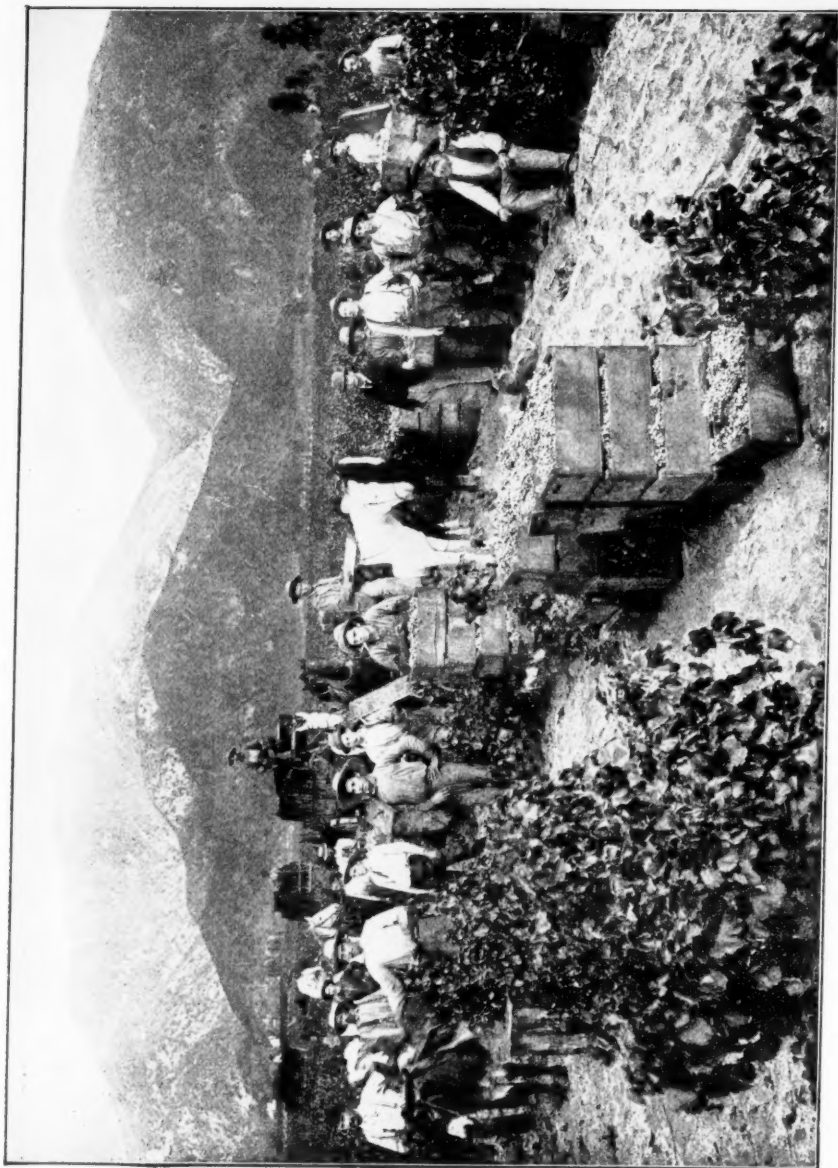
## THE GRAPE-GROWING INDUSTRY IN THE UNITED STATES

THE cultivation of grapes for the market, for raisins, and to make wine has become an important business of the United States during recent years. Two hundred million dollars of capital are invested in this and dependent industries. California supplies the people of the country with practically all the raisins that they eat, 100,000,000 pounds, and the same state, with New York and Ohio, produces annually 24,000,000 gallons of wine. The annual grape crop, before any of the grapes are changed to wine or raisins, reaches

\$15,000,000 in value and nearly 750,000 tons in weight.

The early settlers of the Atlantic coast found wild vines everywhere, but their attempts to start vineyards in the East failed miserably, as they tried to grow varieties imported from Europe. It was not until they began to experiment with some of the wild varieties growing so luxuriantly on the coast that they had any success.

About 1824 Mr John Adlum, of Georgetown, D. C., obtained the well-known Catawba grape by improving a

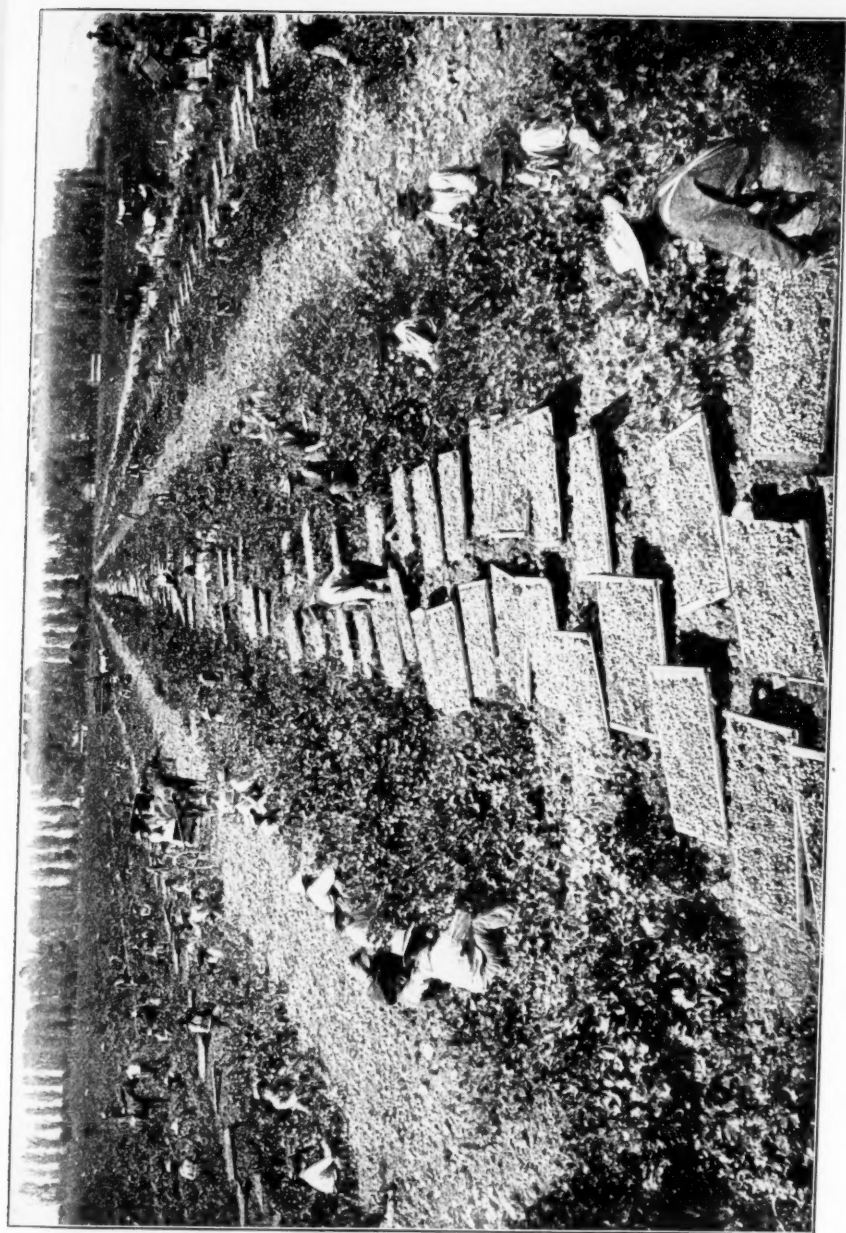


From George C. Husmann, U. S. Department of Agriculture

### Picking Grapes in California

California produces about 22,000,000 gallons of dry and sweet wine yearly. The California Wine Association, at its own wineries in 1902 crushed 150,000 tons of grapes and at its leased wineries enough more to make 225,000 tons. In the fall of 1902 the association paid out in cash over \$5,000,000 for grapes.

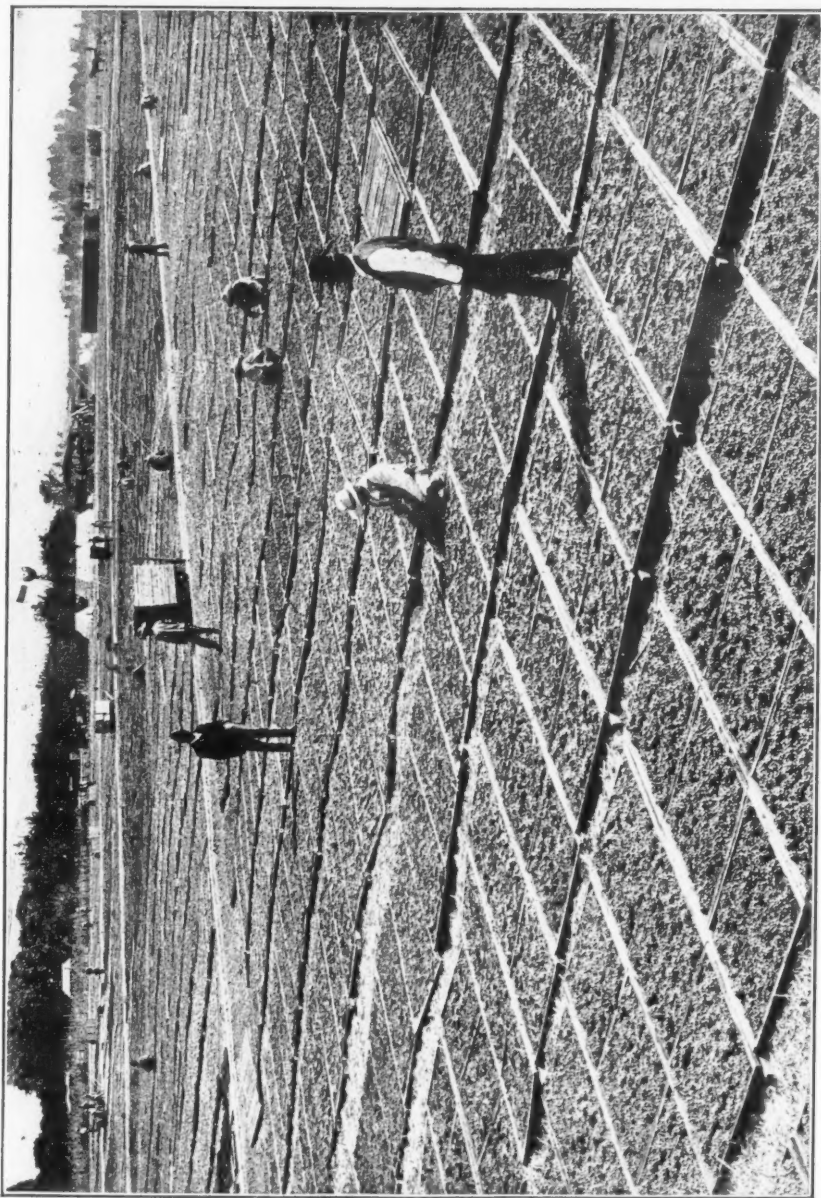




From George C. Husmann, U. S. Department of Agriculture

### Picking Raisin Grapes in California

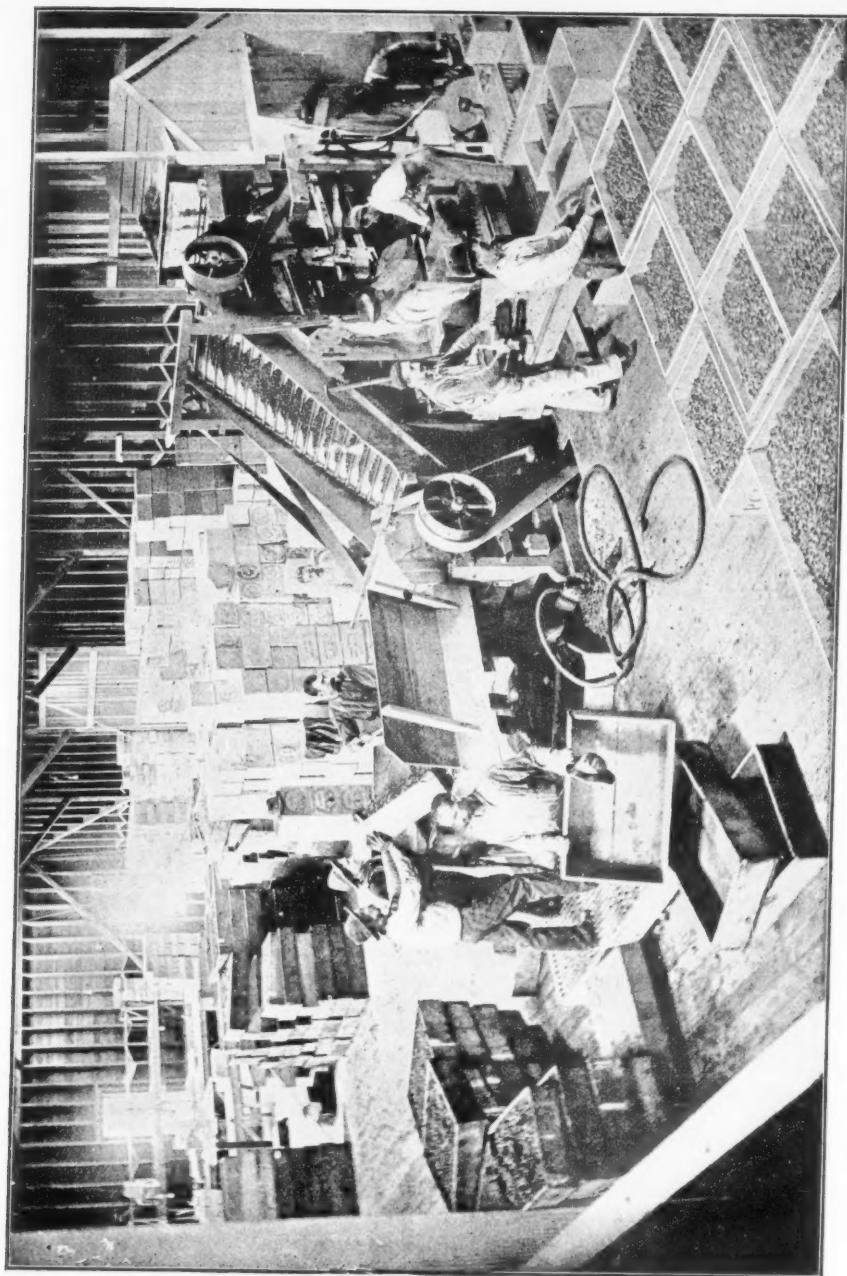
It takes from 3 to 4 pounds of grapes to make one pound of raisins. Frequently it rains enough in November to cause considerable damage to partially dried raisins and grapes. It is then that the Japanese laborers watch the predictions of the Weather Bureau, and when rain is indicated ask as high as 50 and 75 cents an hour for turning and covering the trays of raisins that are out in the vineyards. So familiar has this practice become that the school children who are large enough get excused from school for the work. In fact, the labor question is one of the most serious problems the growers have to contend with. The Chinese and Japanese laborers (especially the Japanese) control the situation, and make from \$2 to \$3.50 and even as high as \$4 per day picking grapes.



From George C. Husmann, U. S. Department of Agriculture

### Drying Seedless Raisins in California

The average time of drying and curing a tray of raisins is about three weeks. Some of the larger growers, in order not to run so much risk in drying on account of rain and to save time in handling the crop, have curing houses, where the curing is finished after having been partially done outside.



From George C. Husmann, U. S. Department of Agriculture

## Stemming Raisins in California

California produces 100,000,000 pounds of raisins yearly. These supply the American people with practically all they want. We now import only six million pounds annually, although as recently as 1885 it was necessary to import 53,000,000 pounds from Spain and Greece.



From George C. Husmann, U. S. Department of Agriculture

#### Packing Raisins in Layers in California

wild American grape. He was exceedingly elated with his discovery, and in a letter to a friend says that "in bringing this grape into public notice I have rendered my country a greater service than I would have done had I paid the national debt." Though the national debt was then \$90,000,000, Mr Adlum probably did not exaggerate the value of his discovery.

Twenty years later, in 1844, Mr Ephraim Wales Bull, of Concord, Mass., obtained the famous Concord grape from the seed of another wild variety. The Concord has since become the most widely known, most generally planted, and for all purposes the best American grape yet introduced. Nine-tenths of the great crop of 85,000 tons of grapes from the Chautauqua grape belt on Lake Erie, in 1900, were Concord. The first Concord vine, from which stock the millions of vines of this variety have come, still lives in the garden of Mr Bull's cottage.

In 1830 there were 88 varieties of American vines known. Today there are at least 1,000.

In California the Mission fathers succeeded at an early date in growing a European grape for their own use. They had but one variety, which is still largely grown, and is known as the Mission. The Mission vine planted at Montecito, Cal., in 1795, was exhibited at the Centennial Exposition in Philadelphia. Some of the choicest European varieties have since been introduced and have thriven in their new home.

Mr George C. Husmann, of the Department of Agriculture, has recently published an exceedingly valuable paper on "Grape, Raisin and Wine Production in the United States," from which these facts are derived.\*

In the United States there are two distinct grape-producing sections—one

\*Year Book of the Department of Agriculture, 1902, pp. 407-420.



east of the Rocky Mountains, where the American varieties are largely and profitably grown; the other in California, where the foreign or *Vinifera* varieties have found a congenial home.

To the late Senator Leland Stanford, founder of the Leland Stanford Junior University, belongs the distinction of having had the largest vineyard in the world, comprising nearly 5,000 acres and being over 7 miles long. The wineries on the place cover more than 6 acres of roof surface, and during the years Mr Husmann had charge of them from 2½ million to 3 million gallons of wine were made annually, from 400 to 850 tons of grapes being crushed daily. Throughout California there are a number of vineyards of 500 acres each.

At Asti the Italian-Swiss colony has 1,700 acres in bearing vineyards. On the place are extensive wineries, with the largest wine vat of the world, holding 500,000 gallons. Near Cucamonga the Italian Vineyard Company has, during the last three years, planted nearly 2,000 acres in one field. The Riverside Vineyard Company during the same time planted 2,500 acres in one vineyard.

The amount of wine made in the United States is, however, very small compared to that produced in the countries of Europe. Even Turkey, whose Mohammedan population drink little wine, produces nearly twice as much wine as the United States.

In 1901 France produced of wines 1,523,233,200 gallons; Italy, 1,013,760,000; Spain, 520,080,000; Portugal,

155,760,000; Austria, 116,160,000; Roumania, 87,120,000; Chile, 85,120,000; Russia, 76,560,000; Bulgaria, 73,920,000; Germany, 60,720,000; Argentina, 55,440,000; Turkey, 50,160,000; Greece, 32,300,000; Switzerland, 31,680,000; United States, 29,500,000, and Servia, 23,760,000 gallons. The industry in the United States is as yet in its infancy. A beginning has just been made in a commercial and business-like manner to improve methods and expand markets. California has produced and sold annually the last ten years an average of 20 million gallons of wine, 2 million gallons of brandy, and 80 million pounds of raisins. Her wines and brandies have taken high honors at all important expositions, including that at Paris in 1900, and they are rapidly finding their way into all the principal markets of the world.

So far the raisin industry of this country has only supplied the small home demand of 100 million pounds, whereas the present population, were it to consume as much per capita as some other countries, say Great Britain, would now use 400 million pounds annually, not to say anything of extending markets and exporting to other countries.

When it is considered that France in 1901 produced 1,523,233,200 gallons of wine, while this country produced 29,500,000 gallons, and that the Golden State alone has a grape and wine producing area almost equal to the whole of France, some idea can be formed of the great possibilities of this important industry.

## PRECIOUS STONES

THE United States can supply all the wants of its people for coal, iron, copper, petroleum, and all the useful minerals; gold and silver also are found in generous quantities; but of

precious stones, the diamond, the ruby, the emerald, the topaz, etc., it has practically none, except what it has bought abroad. In 1902 we paid \$25,000,000 to foreign countries for precious stones



that we imported, while during that year precious stones of the value of only \$338,000 were found within our borders. These were principally sapphires from Montana, turquoises from New Mexico, Arizona, Nevada, and California, and tourmalines and chrysoprases from California.

The United States Geological Survey has just published a report by Mr George F. Kunz on "The Production of Precious Stones in 1902,"\* which contains much interesting information as to the origin of the different stones.

Nearly all the diamonds come from the Kimberley mines.

The South African mines have recovered from the set-back of the Boer war, and apparently have an inexhaustible supply of diamonds. In the various mines a total of over 40,000,000 loads of blue or diamantiferous ground is blocked out, meaning probably more than 10,000,000 carats of diamonds. The largest pile of diamonds ever brought together was collected at the De Beers mine in South Africa in July, 1900. The directors wanted to know the quantity of diamonds necessary to fill a certain measure. Diamonds of all kinds were put in just as mined, and it was thus ascertained that a cubic meter of diamonds weighs 11,976,000 carats and has an approximate value of about \$76,000,000. Up to the present time the Kimberley mines have produced more than \$500,000,000 worth of uncut diamonds.

The number of diamonds from Brazil has fallen considerably during the last several years, because of the crude and unsystematic methods of hunting for them. Some 5,000 people are engaged in diamond mining there, but their tools

are the commonest—a hoe, a crowbar, an iron hook on the end of a pole, or a hammer and two basins for washing the gravel. The accompanying illustrations show two remarkable carbons from Brazil found on one claim—the first in 1894 and the second in 1901. The carbons are split into many pieces and used for diamond drills. The present output of 2,500 carats of carbons a month cannot supply the demand for them for mining and drilling machinery. The price per carat demanded by the miners in the field has jumped to \$11 and \$11.20 for carbons, which is more than is paid for average uncut diamonds.

A new diamond field is being exploited in southwestern Borneo, where diamonds have long been known to exist. In the region of the Landak River, near the mouth of the Soran River, a piece of so-called serpentine has been obtained which incloses a diamond apparently in its true matrix. The Rajahs of Panembohan and Ponggerans possess an immense belt studded with diamonds, said to be from this district, one stone weighing 67 carats. It is a peculiar belief of the natives that the gold and diamonds in the earth are a sort of bank, and should be worked only when they themselves need money, since they believe that gold and diamonds are always there when they desire them. The great Borneo diamond of Mattam, said to weigh 367 carats, is believed to be from this same region.

India, so long renowned in history and tradition as the source of gems, produced in 1902 no diamonds and no precious stones, with the exception of considerable numbers of rubies mined in Upper Burma. The leading gem dealers of Paris and Amsterdam have agents at Mandalay who buy the rubies directly from the Shans. The finest rubies go to Paris.

In examining rubies the Shans never use artificial light, holding that full sunlight alone can bring out perfectly

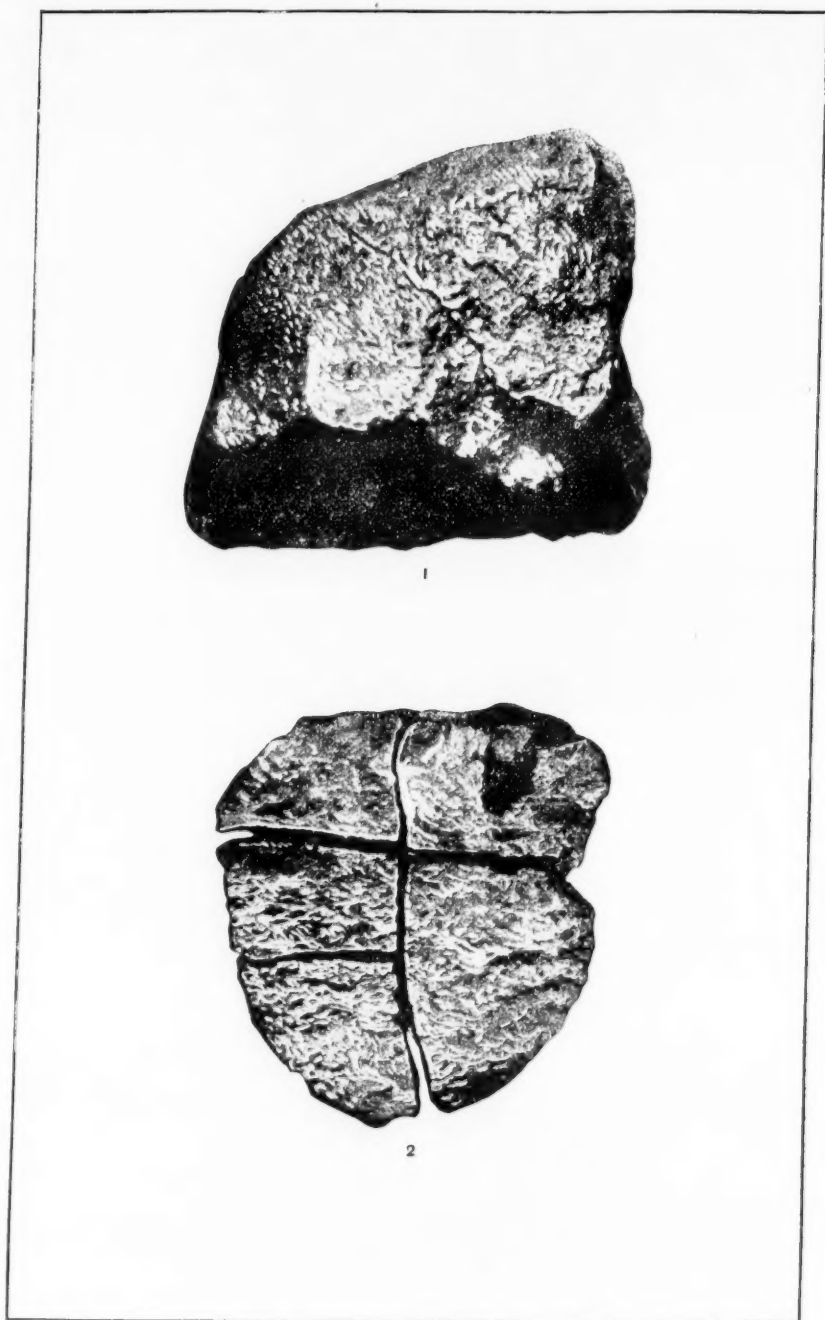
\*The Production of Precious Stones in 1902. By George F. Kunz. Extract from mineral resources of the United States, calendar year 1902; David T. Day, Chief of Division of Mining and Mineral Resources. Washington: Government Printing Office. 1903.



From George F. Kunz, U. S. Geological Survey

**The Largest Piece of Carbon Ever Found. Actual Size**

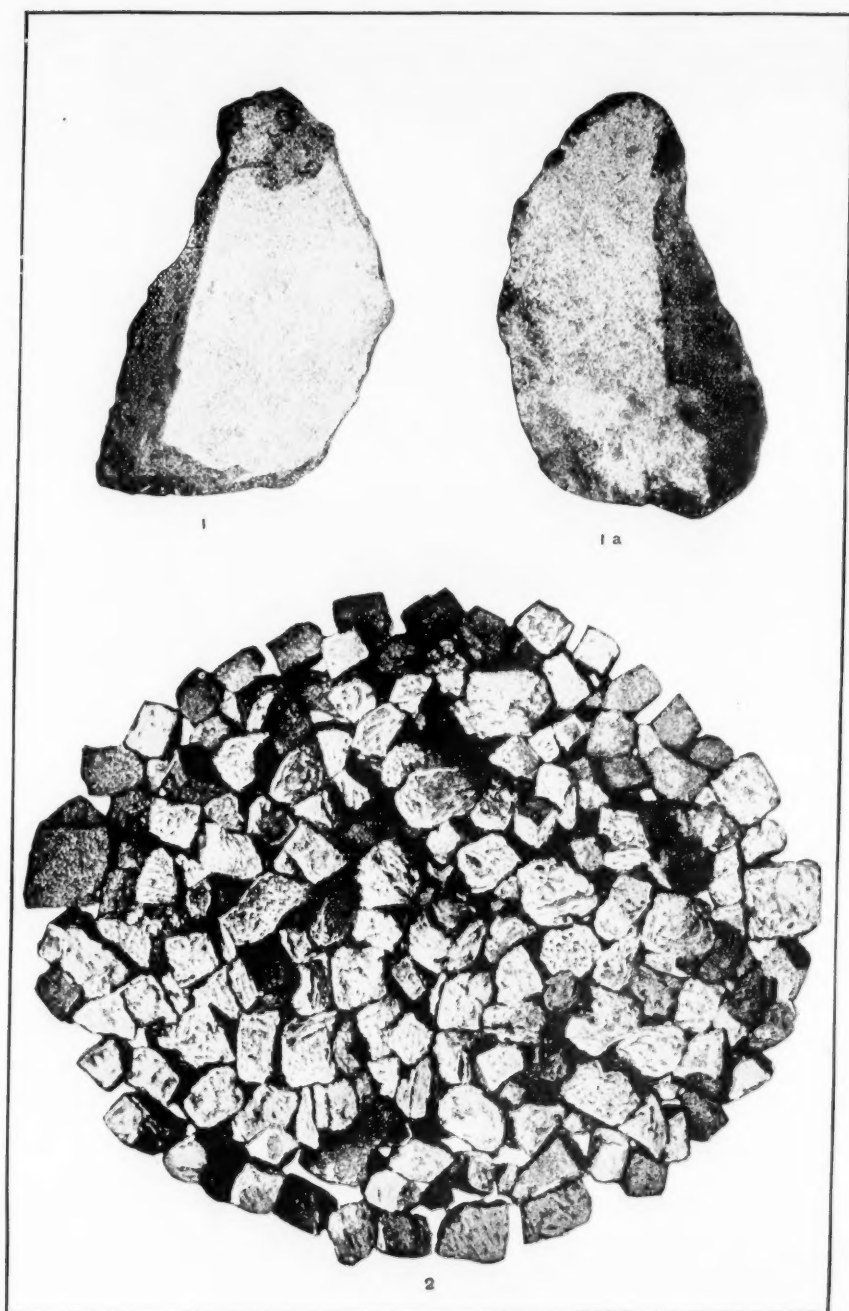
The carbon was found in Brazil in 1894. It weighed 3,078 carats or 20.3 troy ounces. The finder sold it for \$16,000 to a speculator, who resold it for \$32,000. After it had been broken into pieces for use as a diamond drill its value was about \$130,815.



From George F. Kunz, U. S. Geological Survey

Process of Breaking the Third Largest Piece of Carbon Ever Found. Weight,  $750\frac{1}{2}$  Carats; Value, \$23,600. Found in Brazil, 1901

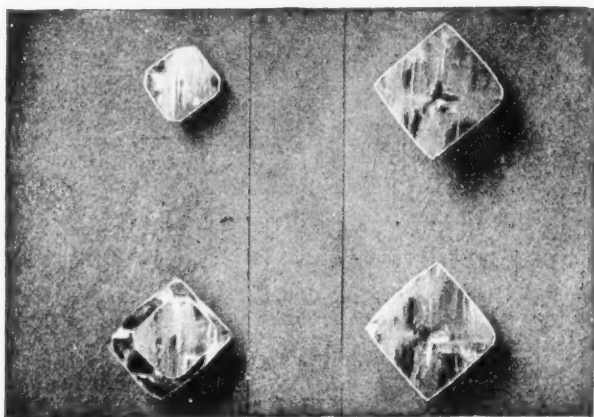
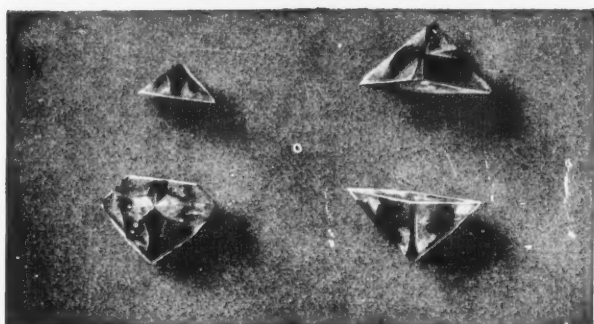
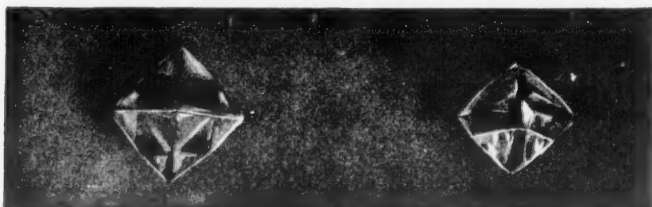
1. Outer half of the piece, showing a break diagonally across it. 2. Reverse (inner) side of 1, showing three breaks, making five pieces of the half of the carbon



From George F. Kunz, U. S. Geological Survey

The Carbon Shown on the Opposite Page as Finally Broken into Pieces for Drills

1, 1a. Inner sides of upper part of the carbon shown as Fig. 2 in the preceding illustration.  
2. The entire piece of carbon broken into pieces weighing from three to four carats each, the sizes generally used for diamond drills.



From George F. Kunz, U. S. Geological Survey

#### Diamond Sawing by a Process Recently Invented by an American

The diamond is held firmly and very steadily under pressure against a rapidly revolving disk of sheet iron or "phosphor" bronze. The wheels are much like those used in sawing thin sections for microscopic rock sections or for cutting jade, rock crystal, and other hard stones. It is claimed that in thus dividing an octahedron at the center or girdle as little as 2 per cent of the weight of the crystal is lost—a great saving of material. As evidencing the wonderfully keen responsive business acumen which has always characterized the "rough" syndicate, the price of all rough diamonds that could be improved or advanced in value by such sawing was immediately advanced when the process became known.



the color and brilliancy of the gems. Sales must therefore take place between the hours of 9 and 3, and the sky must be clear..

The purchaser, placed near a window, has before him a large copper plate. The sellers come to him one by one, and each empties upon the plate his little bag of rubies.

The bright copper plate has a curious use. The sunlight reflected from it through the stones brings out a color effect with true rubies different from that with red spinels and tourmalines, which are thus easily separated.

The buyer and seller then go through a very peculiar method of bargaining by signs, or rather grips, in perfect silence. After agreeing on the fairness of the classifications, they join their right hands, covered with a handkerchief or a flap of a garment, and by grasps and pressures, mutually understood among all these dealers, they make, modify, and accept proposals. The hands are then brought out, and the prices are recorded.

The larger single stones are valued according to color and shape for cutting, the very fine ones bringing high prices. A ruby of  $36\frac{1}{2}$  carats from the Mogok mine some years ago brought 90,000 rupees (\$30,000) at Calcutta.

Cutting is an important industry at Mandalay, and the Burmese workmen have remarkable skill, especially in avoiding loss in weight. European cutting they consider very wasteful, and at Mandalay a man would not be employed who sacrificed more than one-fourth of a ruby, while at Antwerp a loss of two-thirds is not uncommon. The tools are extremely simple. The stone is first shaped with a small steel chisel and wooden mallet, as far as possible, according to its cleavage. The facets are then ground and polished on a copper wheel with ruby dust, the stone being held with wax or lac on a curved piece of ox horn. A month or six

weeks may be occupied in cutting and polishing a ruby of one carat.

The pale stones, cut rounded (cabochon) with a concave base, are much used for ornamental work, especially upon gold vessels. The luster of the gold beneath appears to enrich and darken the ruby and give it the true pigeon's-blood color.

Agates, amethysts, rock crystal, and golden topazes are shipped in great quantities from Brazil. Almost all of them go to Idar and Oberstein, in Germany, where they are cut into ornaments. Last year 200,000 pounds of agate and six tons of rock crystal were cut into seals, paperweights, and faceted stones. One wonderful geode yielded over 40,000 pounds of amethyst.

A great quantity of sapphire of a very dark blue, almost black, color, with a greenish tint, and occasionally entirely green, was imported from Australia. The tourmaline, principally the red (rubellite) and also the aquamarine from Brazil, have been sought for, and considerable quantities of both have been sold at Idar.

It is interesting to note the increasing variety of ornamental and semi-precious stones now being brought into use, and particularly the introduction of jade.

This beautiful stone has from prehistoric times been the especial favorite of uncivilized or semi-civilized peoples, and in China, Japan, and India it has yielded the choicest objects of oriental art. At the Paris Exposition of 1900 a remarkable exhibit was made of Siberian jade wrought by European artists, and now the Oceanic jade of New Zealand, long prized and carved by the Maoris, is becoming immensely popular with the civilized world.

Great boulders of it have recently been discovered in New Zealand, in the river beds, from one of which two panels, translucent and of a rich pure green color, were cut, which were over one

yard long, two-thirds of a yard wide, and only one-eighth of an inch thick. Nearly all the jade of New Zealand was sent to Germany and there cut into stones for rings, scarf-pins, studs, and for ordinary jewelry purposes, such as those for which sard and agate have heretofore been used.

The diamond syndicate, composed of the South African mine owners, manage the sale of their diamonds very shrewdly. A purchaser must buy not only the variety of diamond he wants, but also all the other varieties from the mines. The syndicate sells its diamonds in parcels or series; each parcel is made up of the different varieties of diamonds in the proportion in which each dia-

mond is found. In this way the unpopular varieties are disposed of as quickly as the popular ones.

The diamond-cutting industry in the United States has advanced very rapidly during recent years. American diamond-cutters would now be able to cut all the diamonds for this country if they could get enough rough diamonds. As it is, the rough diamonds sent over supply only one-half of the demand.

The American cutters have invented a number of new mechanical labor-saving devices, which have given them a great advantage over the European cutters, where diamond cutting is done by the ancestral "rule of thumb" handed down from father to son.

## NOTES ON PANAMA AND COLOMBIA

**I**T is supposed by some that Panama derived its name from the native word for butterfly. Explorers of the interior tell of swarms of butterflies which at times rise on the slopes of the mountains in dense clouds, darkening the sunshine. Others maintain that the name is from an Indian word meaning abounding in fish.

The Republic of Panama is believed to have about 300,000 people, living in towns and hamlets. It extends east and west for about 450 miles, with an average breadth of 70 miles from sea to sea. Its area is about 31,500 square miles. Thus the population of the state about equals that of Washington, D. C., while its area is a little greater than the area of South Carolina. The commerce of Panama amounts to \$3,000,000 per annum. These figures are supplied by the Bureau of Statistics of the Department of Commerce and Labor, and are from reports of the United States consuls at Panama and Colon, which have just been received by the Bureau and are not yet published.

The principal ports are Panama, on the Pacific coast, and Colon, on the Atlantic side, and these ports are visited annually by more than one thousand vessels, which land over one million tons of merchandise and nearly one hundred thousand passengers, chiefly for transfer over the Panama Railway, 47 miles in length, connecting the Pacific port of Panama with the Atlantic port of Colon.

Colon, sometimes called Aspinwall, has a population of about three thousand persons. It was named in honor of Columbus, who discovered the bay in 1502. The city of Panama has a population of about twenty-five thousand. It was founded in 1519, burned in 1671, and rebuilt in 1673. During the sixteenth and seventeenth centuries Panama was one of the wealthiest of the Spanish towns in the New World, as all the plunder from the Pacific coast passed through the city. It "had eight monasteries, a cathedral, and two churches, a fine hospital, 200 richly furnished houses, nearly 5,000 houses of humbler sort, a Genoese chamber of commerce,

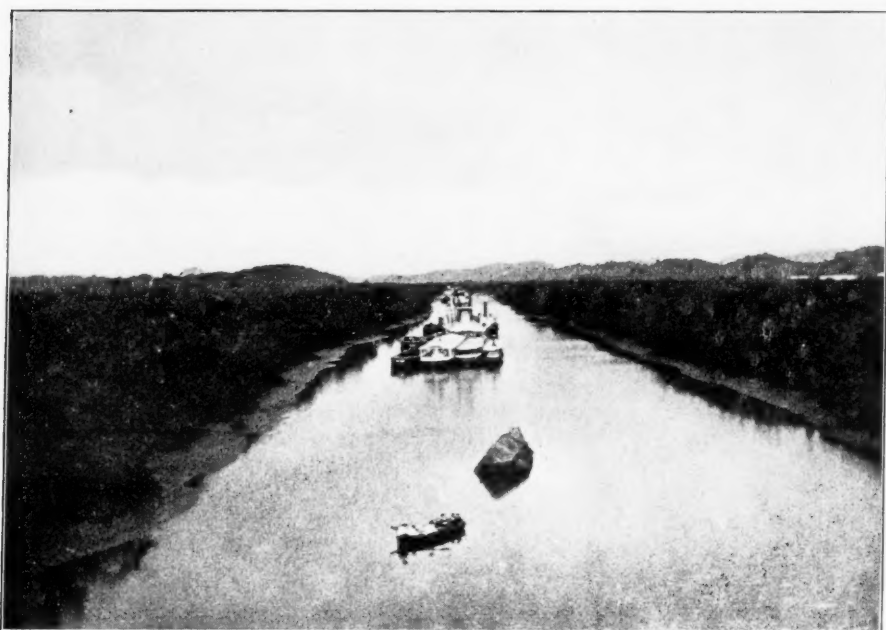


Photo by Robert T. Hill

An Uncompleted Section of the Panama Canal

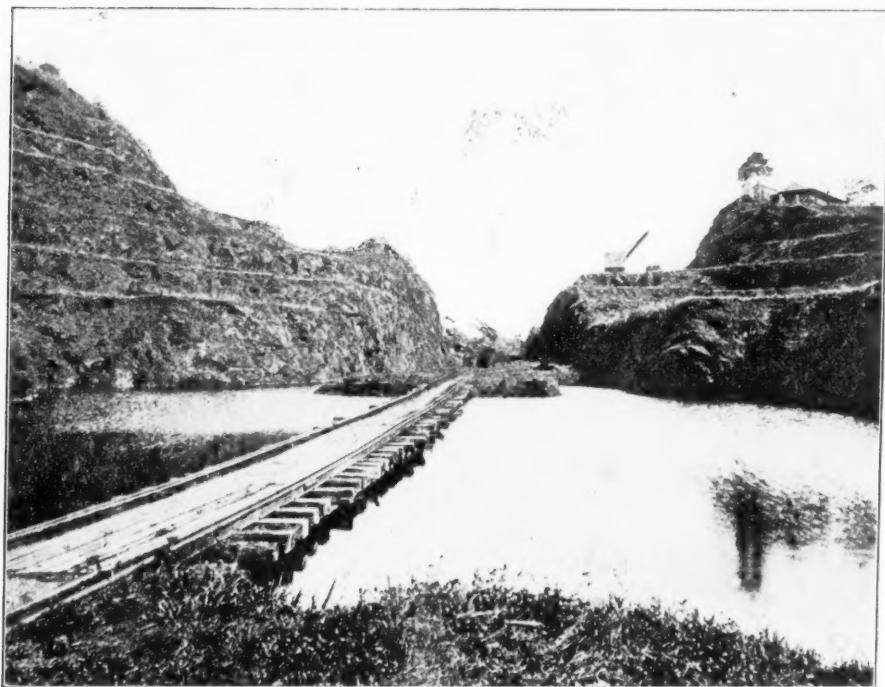


Photo by Robert T. Hill

Canal Cutting Through Massive Basaltic Rock



Photo by Robert T. Hill

Panama Bay. The Island of Toboga, Famous for its Delicious Pineapples



Photo by Robert T. Hill

Washerwomen—Isthmus of Panama

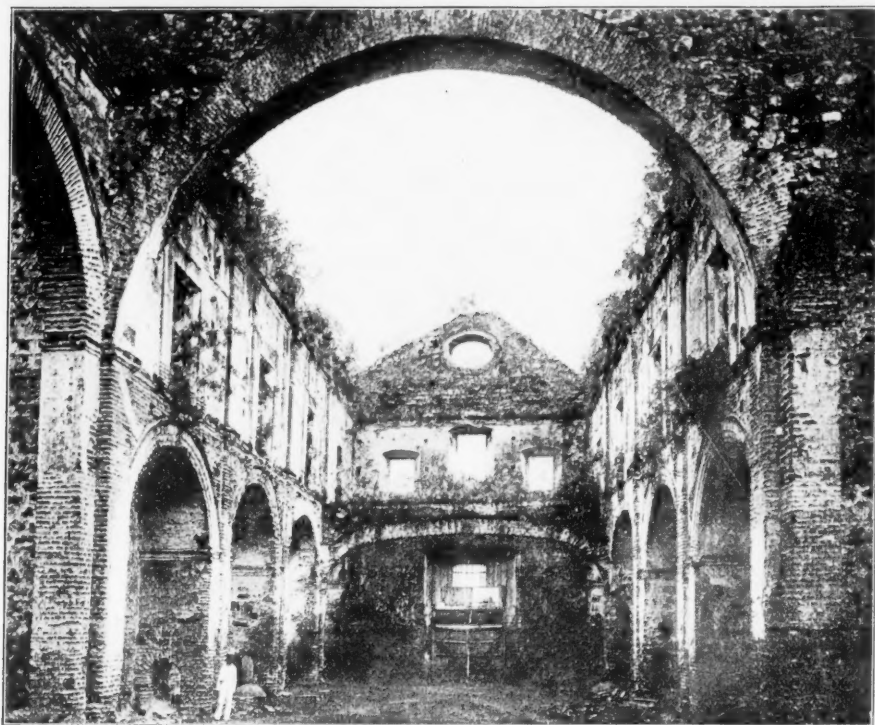


Photo by Robert T. Hill

#### Panama. Interior of Ruins of Old Cathedral

In the back of the picture will be seen a brick arch of about 30 feet span and less than 4 feet spring. The preservation of this arch testifies to the freedom of this region from serious earthquake disturbances.

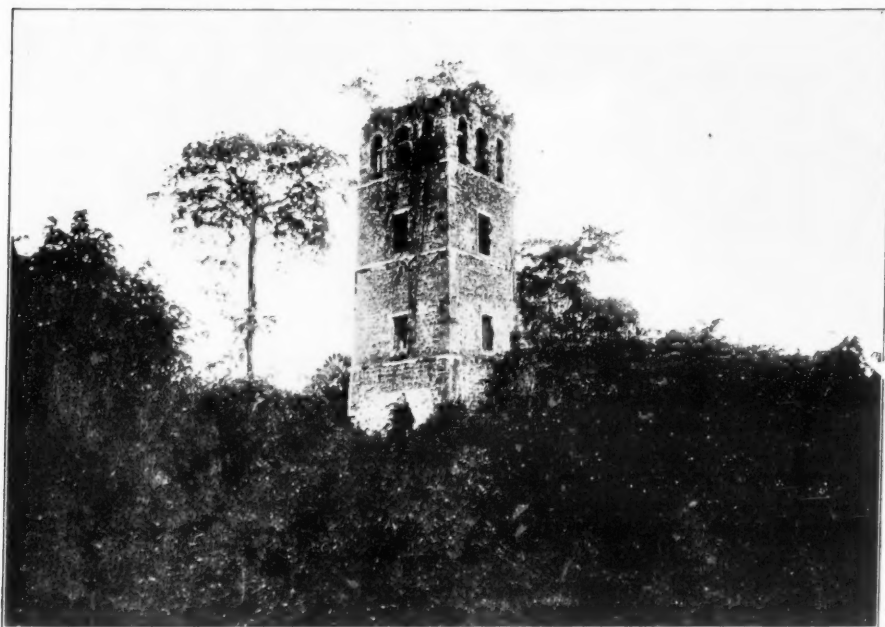


Photo by Robert T. Hill

Panama. This Tower Alone Remains to Mark the Site of the Great City before it was Sacked by Sir Henry Morgan



and 200 warehouses, and was, after three weeks of rapine and murder, burned February 24, 1671, by Morgan's buccaneers, who carried off 175 laden mules and more than 600 prisoners."\* Colon is of much more recent date, having been founded in 1855.

The population, which, as already indicated, amounts in number to about three hundred thousand, is composed of various elements—Spanish, Indian, Negro, and a limited number of persons from the European countries and the United States, especially those engaged in commerce and transportation and the operation of the Panama Railway. Since the abolition of slavery in Jamaica a considerable number of blacks and mulattoes have settled on the Isthmus as small dealers and farmers, and in some villages on the Atlantic side they are said to be in the majority, and as a result the English language is much in use, especially on the Atlantic side. Some of the native population have retained their customs, speech, and physical type, especially those in the western part of the province, and claim to be descendants of the natives found in that section by the Spaniards when they discovered and conquered the country.

Of the commerce of Panama, the United States supplies a larger share than any other country. The importations at the port of Colon during the fiscal year ended June 30, 1903, as shown by the report of the United States consul, amounted to \$952,684, of which \$614,179 was from the United States, \$119,086 from France, \$118,322 from England, \$76,386 from Germany. The exports to the United States from Colon in 1903 amounted to \$173,370, of which \$75,432 was bananas, \$54,960 cocoanuts, \$12,472 turtle shells, \$9,400 ivory nuts, \$6,460 hides, and \$5,924 coffee.

From the port of Panama the exports to the United States in the fiscal year 1903 amounted to \$193,342, of which

\$56,767 was hides, \$49,974 India rubber, \$27,805 cocobolo nuts, \$16,598 ivory nuts, \$13,372 deerskins, and \$6,908 coffee. The consul at Panama states that the imported articles come mostly from England, Germany, France, Italy, and the United States, but gives no statistics of the imports.

Panama is connected with San Francisco by a weekly steamer schedule operated by the Pacific Mail Steamship Company, and with Valparaiso by a weekly steamer schedule operated by the Pacific Steam Navigation Company and South American Steamship Company. Two passenger and two freight trains leave Panama daily for Colon, and Colon daily for Panama. The time for passenger trains over the 47 miles of railway is three hours.

From Panama there is one cable line north to American ports and one to the south. The actual time consumed in communicating with the United States and receiving an answer is stated by the consul to be usually about four hours. There are also lines from Colon to the United States and Europe.

The money of the country is silver, the rate of exchange having averaged during the past year about 150 per cent.

The climate of the isthmus of Panama has proven most deadly in the past. Even the tough negroes imported from Jamaica have quickly succumbed to the marsh fevers and tropical diseases of the country. The excessive death rate has been principally due, however, to an utter disregard of sanitary laws. A sensible and efficient administration will be able to improve conditions and to make the lives of all on the Isthmus safer.

Along the route of the canal the country is accurately surveyed, but there are large sections beyond which are unexplored.

#### COLOMBIA

Colombia has more than ten times the population of Panama. The last census

\* Travels of Pedro de Cieza de Leon, Hakluyt Society, 1864.



A Street of Colon

Photo by Robert T. Hill



Photo by Robert T. Hill

Colon—Driveway of Christofer Colon, the Canal Suburb

The ground is made from débris of the Canal dumped into the bay



Photo by Robert T. Hill

Colon. Residence of the Superintendent of the Panama Railway Company at the Entrance of Limon Bay



Photo by Robert T. Hill

Panama Bay. The Island of Naos, Terminus of the Pacific Mail Line

was taken 32 years ago; but an official estimate made in 1881 gave her about 3,600,000, not including the people of Panamá. Colombia has no army to speak of, no ships, no money, only a few miles of railway, and hence no means of sending a good force against Panama.

Bogota, the capital, is called the Athens of South America, and has a population of 125,000. The national university is located in the city and there is a valuable library of 50,000 volumes, an observatory, a picture gallery, and several learned institutions.

An intending visitor to Bogota is landed at Barranquilla, at the mouth of the Magdalena River; thence he proceeds by steamer up the river for 592½ miles to Honda, then by rail 22 miles to La Dorada, then by mules 45 miles to Facatativa, and thence by rail 24 miles, when he finally reaches the Colombian capital.

Colombia, exclusive of Panama, is as large as the two states of California and Texas combined. Three high mountain ranges cross the republic from north to south, making high table-lands between, where the days the year round are scarcely hotter than those of a temperate zone. On the Bogota table-land the glass oscillates between 50° and 78° Fahr., while the annual rainfall rarely exceeds 45 inches. In the lowlands, of course, the tropical sun beats down with an intensity that makes those sections uninhabitable by the white man.

The people are a mixture of races. At the time of the Spanish conquest the population of Colombia was estimated at eight million. Wholesale butcheries and enslavement in the mines reduced the number in a few generations to less than a million. Most of the natives were too helpless to resist, but "some retaliated and in the Antioquia district poisoned the salt springs so effectually that they remain poisoned to this day." The present Colombian nationality is a fusion in varying proportions of the aborigines with the whites

from various parts of Spain, including a considerable number of baptized Jews. This Hebrew element is quite noticeable, especially in the province of Antioquia, which is the wealthiest and most prosperous of the departments of Colombia. There is also a considerable African element in the population.

Colombia has great wealth lying untouched on her plains and in her forests and mountains. Dr A. H. Keane describes her resources in the following glowing terms : \*

"So varied and abundant are its natural resources, both above and below ground, that, under a firm and enlightened administration, Colombia, despite the insalubrious climate of many districts, might soon become one of the most prosperous regions in the world. It supplies nearly all the platinum as well as the very finest emeralds brought to the European market, while gold-bearing reefs and washings occur almost everywhere, the total annual yield being about £650,000 and the yield of gold and silver since the discovery nearly £150,000,000. In 1891 as many as 4,960 mines of all kinds were open, including 3,398, 794, and 571 of gold in the three departments of Antioquia, Tolima, and Cauca respectively, besides 32 of emeralds, 14 of cinnabar, 7 of manganese, and several of platinum, silver, lead, mercury, iron, coal, and salt. Extensive coal-fields and reservoirs of petroleum occur in several districts, so that few regions can compare with Colombia for the astonishing variety of its underground products. Scarcely less varied are those of its forests and cultivated lands, including coffee, cocoa, tobacco, sugar, vegetable ivory, rubber, dye-woods, plantains, wheat, and maize; but at present only a small part of the country is under tillage, and the development of its agricultural resources is greatly retarded by the lack of good communications."

\* Central and South America. By A. H. Keane. Vol. I, p. 152.



Photo by Robert T. Hill

### Houses of the Talamancan Indians

The Talamancans are a tribe of uncivilized Indians living on the borders of Panama and Colombia. They are aborigines, and are practically as wild today as in the time of Columbus



Photo by Robert T. Hill

Typical Vegetation of the Isthmus of Panama. Two Talamancans in the Foreground



## THE U. S. SIGNAL CORPS

THE Alaskan telegraph system has been completed by the U. S. Signal Corps. It is now possible to send messages by wire to Valdes, Fort Michael, and to stations along the Yukon River. At present these messages must pass over Canadian lines to the international boundary near Fort Egbert, whence they are carried by the U. S. military lines to their Alaskan destination. A cable has been laid from Sitka to Juneau and up the Lynn Canal to Skagway, connecting by way of White Pass with the Canadian telegraph line, and bringing these important points into instant communication with Washington and London.

Few realize the difficulties that have been overcome in building this network of 1,746 miles of wire. Most of the land lines were put in during the best working season, November to February. The mean temperature for these four months was two degrees below zero. Sometimes it was so cold that the mercury froze solid after it had gone as low as 61 degrees below zero. Gen. A. W. Greely, U. S. A., in his last report as Chief Signal Officer, says of the work:

"It is impossible to adequately set forth the tremendous difficulties under which Alaskan military telegraph lines have been constructed and maintained. In general, it is to be premised that not 20 miles of constructed wagon road exists in the country traversed. As a rule, all material has been sledged into the interior in midwinter or carried by pack animals over the roughest imaginable trails. Conditions were so difficult that some coils of wire were carried 145 miles by pack. The magnitude of the work may be inferred by the statement that from Fort Egbert alone, between November 20, 1902, and June 30, 1903, no less than 220 tons of supplies and material were sledged or packed into the

interior, it being impossible to move a ton by wagon.

"The construction parties, consisting almost entirely of enlisted men of the Signal Corps and of the line of the Army, worked steadily the entire winter, although the conditions under which field work was done were of the most hazardous and appalling character. As an illustration may be mentioned the fact that from November 1 to the end of the winter, by official reports, 60 feet and 11 inches of snow fell at Fort Liscum, adjoining the Copper River Valley.

"In the interior, while the snowfall was very much less, being only 4 feet 4 inches at Egbert, yet continued and terrible cold made camp life and construction work almost insupportable. The mean temperature at Fort Egbert from November to February, inclusive, a period of four months, was 2° below zero. There were prolonged periods of extreme low temperature, when the mercury remained frozen, the minimum of 61° below zero occurring in January. While the past winter is believed to have been the most severe in Alaska for many years, yet such was the resourcefulness and endurance of the American soldier that the work of construction in the valley of the Tanana was carried on the entire winter without loss of life and with only one serious case of freezing.

"The cold and snow of the winter were, strangely enough, more favorable to completing the system than were the morasses and fires of summer. The final completion of the telegraph system was made just as an extensive forest fire devastated the upper valley of the Tanana, burning thousands of square miles of valuable timber and destroying more than 100 miles of telegraph line. The damage was the more serious in that the 100 miles of line destroyed were burnt out not as a whole section, but at vari-

ous points along the distance of 250 miles over which the fire extended."

The cable to connect Sitka and Seattle has been made and is now at San Francisco. It will be laid in the early spring of 1904. The cable was authorized by Congress March 3, 1903. Since that date the entire cable, 1,300 miles long, has been manufactured near New York, transported around Cape Horn, and delivered in perfect condition at San Francisco after its voyage of 16,000 miles; the complicated machinery to handle the cable and the delicate instruments necessary to operate it have been planned by the Signal Corps, made to order in Great Britain, and delivered in San Francisco, and the route from Seattle to Sitka has been surveyed by

Capt. J. F. Pratt, of the Coast and Geodetic Survey steamer *Patterson*, through the courtesy of Supt. Otto H. Tittmann, of the Coast and Geodetic Survey. This is a remarkable record of achievement in seven months, March to September, inclusive.

The gradual transfer of the military telegraph and cable lines in the Philippines to the insular government was begun during the year. It is estimated that if a fee of two cents a word had been charged for all official messages the receipts of the lines would have been \$1,500,000. The cost of construction and maintenance was less than \$500,000, so that there was a net saving to the government of over one million dollars.

## GEOGRAPHIC LITERATURE

**The Island of Formosa.** Past and Present. History, People, Resources, and Commercial Prospects; Tea, Camphor, Sugar, Gold, Coal, Sulphur, Economical Plants, and Other Productions. By James W. Davidson, F. R. G. S., consul of the United States for Formosa. With two new maps, frontispiece in color, one hundred and sixty-eight illustrations from photographs, and colored reproductions of two Chinese posters. Imperial 8vo. Pp. 720. New York: The Macmillan Company. 1903.

Mr Davidson, U. S. Consul to Formosa since 1895, has written a very comprehensive description of Formosa, past and present. His narrative history of the islanders, of their struggles against the Chinese, the Tartars, the Dutch, and the pirates, and of their frequent rebellions and continual battling against the aborigines in the mountains, makes interesting reading. His chapters on the various industries of Formosa are specially valuable. The

island is extraordinarily fertile; it has vast camphor forests, an unlimited supply of coal, gold mines, salt, petroleum, sulphur, and other deposits, and many plants of economic value—indigo, fiber, and paper plants, and many others. Perhaps the most notable chapter of the volume is that describing his visit to Botel Tobago Island.

Botel Tobago (Kotosho) Island is a dependency of Formosa, and some 35 miles from the south Formosan coast. The island is only some 30 miles in circumference, and consists of a single long hill, on the shores of which the savages live. To the ethnologist, the inhabitants of this little land are, perhaps, the most interesting of all the savages in Japan's new colony, and doubtless there are few tribes in the whole East who live in such a primitive manner and who have had so little communication with the outside world as the Botel Tobago savages. An occasional Chinese junk stops off the island to exchange wares, but otherwise the island

had never been visited until a Japanese commission, accompanied by Mr Davidson, landed and explored it soon after the Chinese-Japanese war.

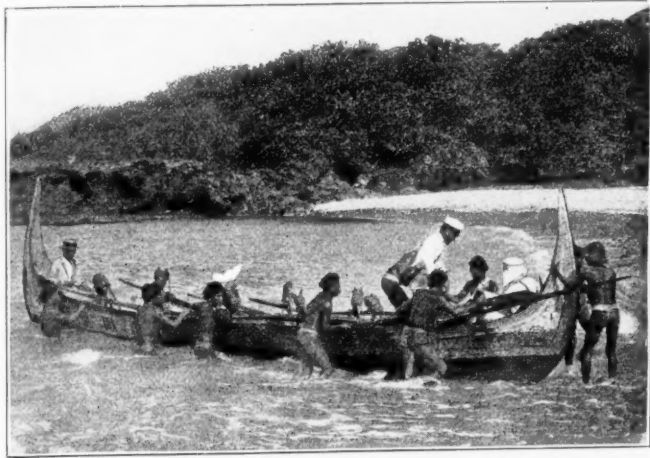
Mr Davidson's account of the island is the first that has been published. The following extracts are reprinted here with his permission. The photographs have not been previously published.

The inhabitants of Botel Tobago, some 1,200 or 1,300 in all, occupy eight villages; Yakunawymen, the largest settlement, being on the west coast and containing about fifty houses. The natives are small, averaging only five feet two inches in height. They are yellowish brown in color, and, with one individual exception, possess straight hair, black with a brownish tint.

The habitations of the Botel Tobago savages are very remarkable, not to say unique. Each family possesses a splendid walled and stone paved compound, wherein are three distinct houses, attesting the cleverness of the natives and their desire to obtain the maximum of comfort. One house, built half under ground, is their winter residence. For the warmer weather they have a comfortable building, elevated some feet above ground, and for protection against the heat of summer they have a tower-like edifice, sufficiently elevated to catch the cool breezes. These huts serve not only as habitations, but also as workshops and storehouses. In construction a considerable amount of wood is used as supports and cross-beams and for the inner floor, ceiling, and walls of the two large huts. The elevated struct-

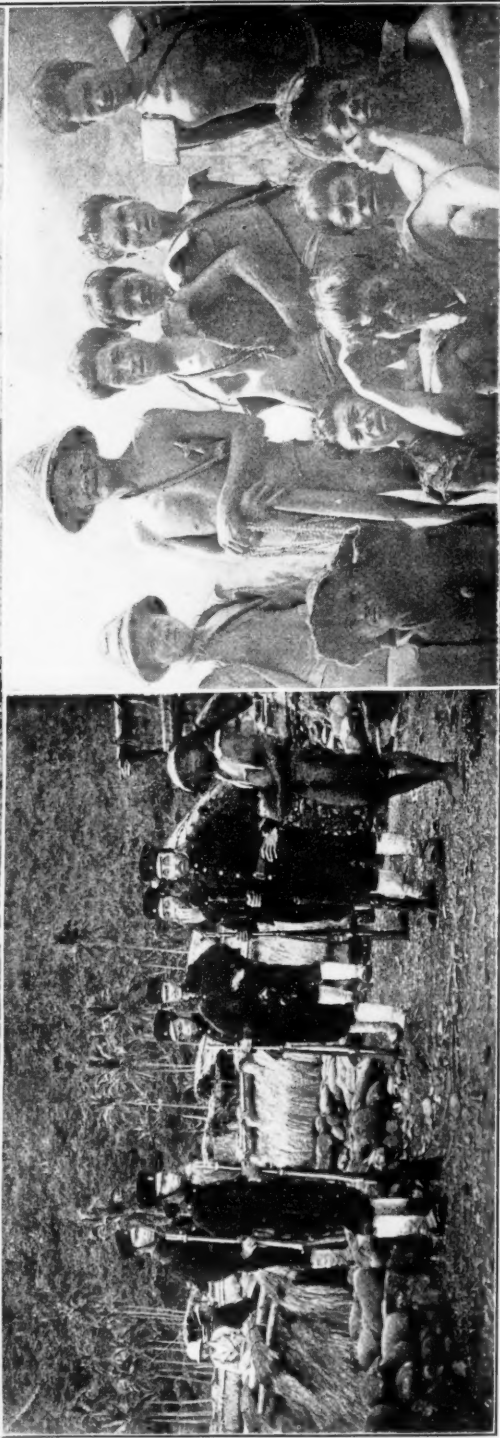
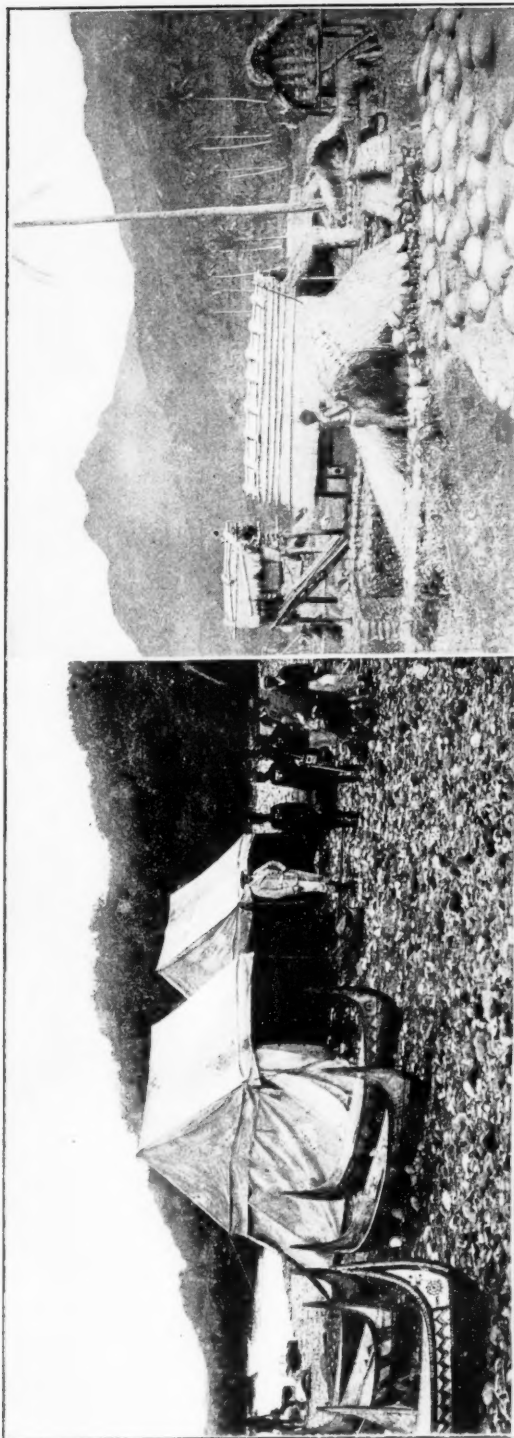
ure is of wood, bamboo, and straw. A shelf projects level with the entrance, and the inhabitants are obliged to mount this and then crawl in on all fours, the doorway not being much larger than the entrance to a good-sized dog kennel.

The room is like a large flat box, some 7 by 8 feet, and is so low that one lying down can almost touch the ceiling with uplifted hands; but the savages always squat, so the place is high enough for them. Human figures and various rather pleasing geometrical designs are engraved on the interior woodwork; the



Landing on Botel Tobago

only other decorations (for such they are considered by the natives) are rows of animal jaw-bones, hung from side to side. The roof is thatched with a strong dried grass, and a similar material appears on the outer walls. The two buildings supported on piles have circular boards surmounting each post to keep off the large rats that literally overrun the island at night. During my first two nights in the island I shared a tent with Major Kikuchi, but on the third night a terrific tropical downpour threatened to sweep us out into the sea,



### Scenes on the Island of Botel Tobago, Formosa

Photos by James W. Davidson

1. Camping on the shore ; several of the beautiful boats of the islanders in the foreground
3. Mr Davidson's Japanese guard

2. The three houses of a native ; one for winter, underground ; one for mild weather, and for summer heat. (See page 469)
4. A group of islanders

and we then removed to one of the native houses, which we found dry and, under the circumstances, comfortable.

All the boats appear to be of one model. They are beautifully rounded, and both stem and stern are shaped alike, being prolonged upward in a graceful curve ending in a point, from which, in time of festivity, is projected a bunch of feathers or some other decoration. It is a built-up boat, and, considering the crude tools used in its construction, is a remarkably creditable affair. The tribe possess no saws, and consequently each plank is adzed down, thus obtaining but one plank from a tree. These planks, forming the sides of the boat, are so carefully shaped that they fit very closely. Holes are bored near the seams, through which rattan lastings are passed and drawn tightly, literally tying the parts together. The bottom planks are fastened to the strong V-shaped keel in the same manner. As in the Solomon Islands, the principal tool used is an adze. In Botel Tobago this implement is so made that it can be converted into a chisel by inserting the blade end first into the handle.

There are no dogs or cats on the island, which accounts for the great pest of rats. Immense rodents as large as the American musk-rat literally overrun the villages at night. One could see them after dark, chasing about the place without the least sign of fear, as hungry hogs would overrun a garden, and it is no exaggeration to say we feared the rats more than we feared the natives.

**The South American Republics.** By Thomas C. Dawson. In two volumes. Illustrated with photographs and maps. Vol. I. Pp. xvi + 525. 5½ by 8 inches. New York: G. P. Putnam's Sons. 1903.

Mr Dawson has been for many years American consul to various capitals of South America. This work is in two

parts, of which the first is out; the second will be published in a few months. The present volume describes Argentina, Paraguay, Uruguay, and Brazil. It is well written, interesting, and reliable and is commended to all who are seeking a good book on South America.

Two South American Republics, Argentina and Chile, may be called prosperous; there are evidences of an awakening in certain sections of a third, Colombia, which may bring equal good fortune to that state. Brazil is also becoming unified, and, according to Mr Dawson, is developing a solidity as a nation which is not generally realized.

Several of the author's statements about this republic, whose area is greater than that of the United States excluding Alaska, are worth quoting:

"Capital is slowly accumulating, and a healthful tendency toward industrious habits and the employment of reasonable and moderate methods in exploiting the great untouched natural resources of the country is evident.

"Leaving out immigration, the Brazilian people have shown a steady natural increase of nearly 2 per cent per annum during this century. The total population has multiplied from less than three to more than eighteen millions. Not a fiftieth part of the territory is cultivated; its resources have never been studied, much less developed."

The Brazilians have the additional advantage of inheriting directly a European civilization. They "are too firmly established, too numerous and prolific, and possess a too highly organized and deeply rooted civilization to be in danger of expulsion or political absorption. Immense immigration into South America is inevitable as soon as the pressure of population is strongly felt in Western Europe and North America. This may transform Brazil economically, but the new conditions will have to fit themselves into the political and social framework already in existence."

1. Camping on the shore; several islanders in the foreground  
2. The three houses of a native; one for winter, underground; one for mild weather, and for summer heat. (See page 469)  
3. Mr Davidson's Japanese guard  
4. A group of islanders



Mr Dawson expresses great faith in the Argentine Republic:

"The industrial impetus already acquired by the Argentine Republic is sufficient to carry it over all obstacles, and it seems assured that there will be a rapid settlement of the whole of this immense and fertile plain. Here Nature has done everything to make communication easy, and a temperate climate insures crops suited to modern European civilization.

"Two grave perils have so far been encountered, namely, a tendency toward political disintegration and an abuse of the taxing power. The former is now remote; for since the railways began to concentrate wealth and influence at Buenos Aires and to destroy the prestige and political power of the provincial capitals, the natural structure built by the patriots of 1853 has stood firmer each year.

"Argentina has had a bitter lesson of the evils of governmental extravagance and still groans under the burden of a debt which seems disproportionately heavy, but the growth of population and wealth will soon overtake it, and the very difficulties of meeting interest are the cause of an economy in administration, of which the good effects will be felt long after the debt itself has been reduced to a reasonable *per capita*. A nation is in the process of formation in the Plata Valley whose material greatness is certain and whose moral and intellectual characteristics will have the widest influence on the rest of South America."

**In Search of a Siberian Klondike.** By Washington B. Vanderlip and Homer B. Hulbert. With many illustrations. Pp. xiv + 315. 5½ by 8½ inches. New York: The Century Co. 1903. \$2.00 *net*.

One of the most interestingly illustrated books of exploration published in a long time. The story is well told. Occasionally the author slips up in his

statements—as, for instance, when he recommends the United States to import their reindeer for Alaska from Kamchatka instead of from Lapland. He is apparently ignorant of the fact that the United States Government has been importing reindeer from across Bering Sea ever since 1891, and has only once brought reindeer from Lapland, in the winter of 1898, when deer were needed immediately to rescue the miners in the Yukon Valley. The Alaskan and Siberian herds could not be drawn on then, because navigation had been closed by the winter ice.

#### BOOKS RECEIVED FOR REVIEW

**The Book of Ser Marco Polo.** Translated and edited by Col. Sir Henry Yule. Third edition. With memoir of Henry Yule by his daughter. Profusely illustrated. Vol. I, pp. cii + 462; vol. II, xxii + 662. 6 by 9 inches. New York: Imported by Charles Scribner's Sons. 1903. \$16.00 *net*.

**On the Polar Star in the Arctic Sea.** By the Duke of the Abruzzi. 2 vols., 8vo. With maps and illustrations. New York: Dodd, Mead & Co. 1903. \$10.00.

**Aus Insulinde, Malayische Reisebriefe.** Von Ernst Haeckel. Illustrated. Pp. xi + 261. 6½ by 9½ inches. Bonn: Verlag von Emil Strauss. 1901.

**Geographic Influences in American History.** By Albert Perry Brigham. With many illustrations. Pp. 366. 5 by 7½ inches. Boston: Ginn & Co. 1903.

**To California and Back.** By C. A. Higgins. With many illustrations. Pp. 317. 5½ by 8 inches. New York: Doubleday, Page & Co. 1903. \$1.50 *net*.

**Vacation Days in Greece.** By Rufus B. Richardson. Illustrated. Pp. 240. 5½ by 8½ inches. New York: Charles Scribner's Sons. 1903. \$2.00 *net*.

- American Railways.** By Edwin A. Pratt. Pp. 309. 5 by 9 inches. New York: The Macmillan Co. 1903.
- Austro-Hungarian Life in Town and Country.** By Francis H. E. Palmer. Illustrated. Pp. 299. 5 by 7½ inches. New York: G. P. Putnam's Sons. 1903.
- Handbook of Climatology.** By Dr Julius Hann. Translated by Robert De Courcy Ward. Pp. vi + 437. 6 by 9 inches. New York: The Macmillan Co. 1903. \$3.00 *net*.
- Special Method in Geography.** By Charles A. McMurry. Pp. vi + 217. 5¼ by 7½ inches. New York: The Macmillan Co. 1903.
- Yearbook of the Department of Agriculture, 1902.** Edited by Geo. W. Hill. Profusely illustrated. Pp. 912. 6½ by 9 inches. Washington: Government Printing Office. 1903.
- The Turk and His Lost Provinces.** By William Eleroy Curtis. Illustrated. Pp. 396. 6 by 9 inches. New York: Fleming H. Revell Co. 1903.
- Winter India.** By Eliza Kuhamah Scidmore. With many illustrations. Pp. xvi + 400. 6 by 8½ inches. New York: Century Co. 1903.
- American History and its Geographic Conditions.** By Ellen C. Semple. Illustrated. Boston: Houghton, Mifflin & Co. 1903. \$1.25 *net*.
- The Texts and Versions of John De Plano Carpini and William De Rubenquís.** As printed for the first time by Hakluyt in 1598, together with some smaller pieces. Edited by C. Raymond Beazley. Pp. 345. 5½ by 8½ inches. 1903. Printed for the Hakluyt Society, 1903.
- The Philippine Islands. 1493 to 1808. Volume VI.** By Emma H. Blair and James H. Robinson, editors. Pp. 320. 6½ by 9½ inches. Cleveland: The Arthur H. Clark Co. 1903.
- The Heart of Japan.** Glimpses of Life and Nature far from the Traveller's Track in the Land of the Rising Sun. By Clarence Ludlow Brownell. Illustrated. Pp. 307. 5 by 7½ inches. New York: McClure, Phillips & Co. 1903. \$1.50 *net*.
- A Monograph of the Culicidae or Mosquitoes.** By Fred V. Theobald. Vol. 3. Illustrated with plates and diagrams. Pp. xiii + 359. 6 by 9 inches. Published by order of the Trustees of the British Museum. London.
- Report on the Collections of Natural History Made in the Antarctic Regions During the Voyage of the *Southern Cross*.** Illustrated. Pp. ix + 344. 6½ by 10 inches. Printed by order of the Trustees of the British Museum. London. 1903.
- A Monograph of the Tsetse-Flies.** By Ernest Edward Austen. With a chapter on Mouth-Parts, by H. J. Hensen. Illustrated. Pp. ix + 319. 6½ by 10 inches. Printed by order of the trustees of the British Museum. London. 1903.
- Proceedings of the American Association for the Advancement of Science.** December, 1902-January, 1903. Published by the permanent secretary. Volume LII.
- Central Europe.** By Joseph Partsch. With maps and diagrams. Pp. 358. 6 by 9 inches. New York: D. Appleton & Co. 1903. \$2.00 *net*.
- Central Asia and Tibet.** Towards the Holy City of Lassa. By Sven Hedin. In two volumes. Illustrated from drawings and photographs. Volume I. Pp. xvii + 608. Volume II. Pp. xiv + 664. 7 by 9½ inches. New York: Charles Scribner's Sons. 1903.
- Handbook of the Saint Louis World's Fair of 1904.** By Charles M. Kurtz. Illustrated. Pp. 115. 5½ by 8½ inches. Saint Louis: Gottschalk Printing Company. 1903.

## RECENT PUBLICATIONS BY THE U. S. GOVERNMENT

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Egyptian Irrigation. A study of irrigation methods and administration in Egypt: Clarence T. Johnston.

Japanese Bamboos and Their Introduction into America: David G. Fairchild.

Three New Plant Introductions from Japan: Mitsumata, a Japanese paper plant; Udo, a new winter salad; Wasabi, the horseradish of the Japanese: David G. Fairchild.

Storage of Water on Cache La Poudre and Big Thompson Rivers: C. E. Tait.

The Diminished Flow of the Rock River in Wisconsin and Illinois and its Relation to the Surrounding Forests: G. Frederick Schwarz.

A Working Plan for Forest Lands in Hampton and Beaufort Counties, South Carolina: Thomas H. Sherrard.

## U. S. FISH COMMISSION

Aquatic Products in Arts and Industries—Fish Oils, Fats, and Waxes, Fertilizers from Aquatic Products: Charles H. Stevenson.

Utilization of the Skins of Aquatic Animals: Charles H. Stevenson.

Statistics of the Fisheries of the Middle Atlantic States: Barton W. Evermann.

## NATIONAL GEOGRAPHIC SOCIETY

## REGULAR MEETINGS OF THE SOCIETY

**T**HESE meetings will be held in the Assembly Hall of Cosmos Club at 8 p. m. until the new home of the Society, Hubbard Memorial Hall, is completed. No tickets are required for these meetings.

**December 4.**—"The Work of the Bureau of Plant Industry." Dr B. T. Galloway.

**December 18.**—"Early Spanish Cartography of the New World," by Prof. E. L. Stevenson, of Rutgers College.

**January 8, 1904.**—Annual Meeting; followed by an address by Prof. Wm. M. Davis, of Harvard University, on "A Summer in Turkestan."

**January 22.**—"The Work of the Bureau of Insular Affairs." Col. Clarence R. Edwards.

**February 5.**—"The Work of the Bureau of Statistics." Hon. O. P. Austin.

**February 12.**—"The Work of the Bureau of Fish and Fisheries." Dr B. W. Evermann.

**March 4.**—"The Work of the National Bureau of Standards." Dr G. M. Stratton.

**March 18.**—"The Work of the U. S. Biological Survey." Dr C. Hart Merriam.

## POPULAR LECTURES

The Popular Lectures will be delivered in the National Rifles' Armory, 920 G street, at 8 p. m., on the following dates (tickets are required):

**Saturday, December 12.**—"Marches and Movements of Arnold and André." By Mr W. W. Ellsworth, of the Century Company. Illustrated.

**Friday, January 15, 1904.**—"Travels in Arabia and Along the Persian Gulf," by David G. Fairchild, Special Agent of the U. S. Department of Agriculture. Illustrated.

**Saturday, January 30.**—"Joys of the Trail," by Mr Hamlin Garland, author of "The Captain of the Gray Horse Troop," etc. Illustrated.

Announcement of definite dates for the following lectures in this course will be made later:

"Conditions in Macedonia," by Dr Edwin A. Grosvenor, of Amherst College. Illustrated.

"The Louisiana Purchase Exposition." By Hon. David R. Francis, President of the Louisiana Purchase Exposition. Illustrated.

Provisional arrangements have also been made for addresses on—

Little Known Peoples of Mexico.

Russia and Japan in Korea.

The Alaskan Boundary Decision.

The general subject of the Afternoon Course of popular lectures is "The Growth of Diplomacy." The special topics and the names of the speakers will be announced in a later program. The first of the series will be given on Saturday, February 27, and the succeeding lectures on March 5, 12, 19, and 26.

These lectures will be illustrated.







# INDEX

	Page		Page
Abercrombie, W. R., Work in Alaska of.....	101	Arctic exploration, Erroneous theories concerning.....	432
Abruzzi, Duke of, cited on North Polar routes.....	431	—, History of.....	424
—, Book on Arctic by.....	472	—, Value of.....	429
Abydos, Excavations at.....	358	—, See North Pole; Peary, Ziegler.	
—, referred to.....	292	Argentina-Chile boundary award.....	115
Adams, C. C., cited on Antarctic explorations.....	212	Argentine, Dawson's book on.....	471
—, United States—Land and waters.....	171	—, Present prosperity of.....	471
Adlum, John, obtains Catawba grape.....	445	Arriaga, A. L., cited on Guatemala volcanic disturbances.....	390
Agave, A field of young plants of.....	152	Asiatic Russia; Book by G. F. Wright.....	121
—, A wild variety of, found in Yucatan.....	151	Austin, O. P., Alaskan Report of.....	148
—, Bales of fiber ready for shipment.....	156	—, cited on internal commerce of United States.....	166
—, Cleaning the fiber of.....	153	—, Election of, as Secretary of National Geographic Society.....	425
—, Drying fiber of.....	155	—; Problems of the Pacific.....	117
—, Tresses of the fiber of.....	154	—, Reports of.....	425
—, See Sisal hemp, Henequen.		—; United States—Her industries.....	301
Agriculture, American capital invested in.....	35	Australia, White population of.....	360
—, Department of. See Various bureaus.		Austro-Hungarian Life, Palmer's book on.....	473
—, Year Book for 1901 of.....	120		
—, — 1902 of.....	473	Bacon, A. M., Book on Japanese girls by.....	121
—, Promoted by U. S. Government.....	35	Bailey, Florence Merriam, Book on birds by.....	119
Alaska, Coast Survey work in.....	9, 467	Bailey, Vernon, referred to.....	119
—, Future of.....	104	Balch, E. S.; America's claims in the Antarctic.....	77
—, Gardening in.....	355	—; Book on Antarctica.....	121
—, Geological Survey work in.....	255, 257, 397	—, cited on South Polar regions.....	162
—, Gold discoveries in.....	257	Balch, T. W.; Book on Alaska frontier.....	116, 298
—, Importance of reindeer to.....	146	Balkan Peninsula, Battle ground of Europe.....	45
—, Map showing reindeer stations of.....	131	—, Turkish rule in.....	46
—, Notable work on.....	300	Barnard, E. C., Work in California by.....	78
—, Opening of.....	79	Bauer, L. A., Magnetic tables by.....	121
—, Reindeer in.....	127	—, Magnetic work by.....	82
—, Salmon fisheries of.....	118	Belgrade, Capital of Servia.....	60
—, Signal Corps in.....	467	Bell, Alexander Graham, Judge of Loubat Prizes.....	40
—, Telegraph system of.....	467	—, referred to.....	252
—, Trade of.....	106	—, Tetrahedral kites of.....	224, 294
—, Wrangell Mountains of.....	395	—; Tetrahedral principle in kite structure.....	219
Alaska Boundary Commission.....	116, 297	—; Resignation as President of National Geographic Society.....	254
— decision.....	423	Bell, C. J., referred to.....	292
— dispute.....	89, 117	Bell, Robert, cited on Canadian forests.....	106
— —, Map showing.....	90	Benguet, Igorrote rice terraces of.....	206
Alaska frontier, Balch's book on.....	16, 298	—, Igorrote town of.....	205
Alexander, King of Servia.....	59	—, Garden of the Philippines.....	203
Alexander of Bulgaria.....	54	—, Tree ferns of.....	203
Alexander, W. H., Bulletin on hurricanes by.....	44	—, White pines of.....	204
Allen, H. T., Alaskan explorations of.....	396	Bertholf, E. P., Point Barrow relief expedition of.....	145
Amazon, Rubber forests of.....	413	—, Siberian reindeer expedition by.....	138
Amazons, The land of.....	43	Birds of the Rockies.....	121
American cotton industry.....	120	Bingham, Utah, mining district.....	168
— diplomacy in the Orient.....	259	Blair, R. E., cited on destruction of Amazon rubber forests.....	413
American Museum of Natural History.....	388, 422	Blount, Henry F., referred to.....	117
American Philosophical Society recommends founding Coast Survey.....	2	Bogoslof Volcano, Description of.....	95
Amundsen, R.; Expedition to Magnetic North Pole.....	293	Bond, Fred, Wheat varieties improved by.....	166
Andre, S. A., Last hope of his life gone.....	118	Bosnia, as an Austrian province.....	45
Andrews, C. L.; Muir Glacier by.....	44	—, Government enterprise in.....	50
—, Surveys of Muir Glacier by.....	44	—, Government hotels of.....	50
Animals before man in America.....	43	—, Jewish cemetery of.....	49
Animal Industry, Bureau of.....	35	—, under Turkish rule.....	46
Antarctic expedition, British.....	109, 210, 297	Botel Tobago, Formosan Island, Description of.....	468
—, German.....	109, 296	Boundary Awards. See Alaska, Argentina, Canada.	
—, Scottish.....	109, 162	Boutwell, J. M., Work in Utah.....	168
—, Swedish.....	109, 296	Brazil, Dawson's book on.....	471
— explorations, Records of farthest south.....	212	—, Precious stones from.....	452, 457
— by Commander Wilkes.....	218	—, Rubber forest of.....	413
— regions, American claims in.....	77	—, Surveys of.....	262
— —, Map of.....	109	Bremner, John, cited on Alaskan explorations.....	395
Antarctica, Book by E. S. Balch.....	121	Brewster, B. B.; Expedition into Texas of Fernando del Bosque.....	339
Appalachian Forest Reserve.....	37, 123	Brigham, A. P., Acknowledgment to.....	174
— streams, Measurements of southern.....	167	—, Book on Geographic Influences on American History.....	472
Appalachian Mountain Club, Officers of.....	39		
Arctic Club, Presidency of.....	297		
Arctic Expeditions; Charcot.....	217, 296		
—; Peary.....	379, 430		
—; Ziegler.....	82, 251, 297		

	Page		Page
Brigham, A. P., Book on Physical Geography by.....	21	Charts, Area covered by hydrographic.....	66
—, referred to.....	295	—, Coast.....	65
British Colonies, White population of.....	360	—, General.....	64
British Columbia forests.....	107	—, Harbor.....	65
Brooks, Alfred H., Explorations in Alaska by.....	257	China, Census of.....	167
—; Plan for climbing Mt McKinley.....	30	Cholera scenes in the Philippines.....	185, 192
—, referred to.....	216, 300, 425	Clark, C. E., Chart made by.....	64
Bryant, Henry G., referred to.....	292	Climatology, ward's book on.....	473
Bubonic plague, Conquest of.....	185	Climate, Effect on insanity of.....	365
Bulgaria, Capital of.....	54	Coal production of the world.....	315
—, Ferdinand of.....	58	Coast and Geodetic Survey, U. S., Acknowledg-	
—, Greek monastery of St John of Ryle.....	53	ment to, by Brazil.....	262
—, People and country of.....	51	—, Catalogue of publications by.....	83
—, Rulers of.....	55	—, Discovers Raleigh Rock.....	148
Bull, E. W., obtains Concord grape.....	450	—, Duties of office force of.....	4
Bureau of American Republics.....	83	—, Field work of.....	6
Bureau of Chemistry, Work of.....	37	—, General work of.....	1
Bureau of Forestry, Checking sand dunes.....	115	—, History of.....	1
—, General work of.....	37	—, Magnetic work by.....	81
—, Report on hardy Catalpa.....	348	—, Present organization of.....	3
—, Work of, in cooperation with railroads.....	328	—, Record of address on.....	44
—, Work of, in cooperation with state governments.....	213	—, Steamer Pathfinder of.....	439
Bureau of Statistics, Report on Dalny by.....	360	—, Surveying parties in the field.....	437, 444
— on Cuba.....	474	—, Work in Alaska by.....	9, 468
— on immigration.....	474	—, Work in Philippines.....	9, 437
— on India.....	81	—, Work in Porto Rico.....	8
— on Panama.....	458	—, Work in United States.....	7
— on rubber industry.....	413	Collier, A. J., Explorations in Alaska by.....	255
—, General reports of.....	445	Coffin, Edward, Capt. Ziegler Polar expedition.....	254, 414
Burritt, Charles H.; Mining Bureau of the Philip-		Collins, G. N., Report on mangoes by.....	320
pines.....	418	Colombia, Area of.....	465
—, Work in the Philippines of.....	418	—, Notes on.....	458
Burroughs, John, cited on Alaska.....	91	—, Population of.....	465
		—, Resources.....	465
Calaminanes Islands, Philippines, Scenes from.....	202	Colon, Scenes in.....	463
California, Big things of.....	240	—, Description of.....	458
—, By-Ways of.....	121	Concord grape, Discovery of.....	450
—, Grape production of.....	445	—, Value of.....	450
—, Hydrographic work in.....	78	Cook, Mrs E. T., Book on London by.....	122
—, Raisin production of.....	445	Cook, F. A., Mount McKinley expedition of.....	297, 425
—, Reclamation of arid lands in.....	78	Cook, O. F., Report on Castilla rubber tree.....	409
—, Wine production of.....	445	Copper production of the world.....	318
Calkins, F. C.; Report on Washington State water		Copper River Valley, Explorations of.....	396
supply.....	80	—, Natural wealth of.....	101
Call, C. J.; Point Barrow Relief Expedition.....	145	Cornell University, Summer school of geography.....	295
Campbell, M. R.; Report on Pittsburg coal district.....	117	Cotton industry of the United States.....	120
Canadian Boundary; John W. Foster.....	85	—, Long staple, grown in the United States.....	36
Canada, Forests of.....	106	—, production of the world.....	318
—, New railway across.....	214	Coville, F. V., referred to.....	217
—, White population of.....	260	Cuba, Development of.....	112
Cape Lazaref, Unimak Island.....	96	—, Public lands of.....	113
Cape Prince of Wales, Freighting with reindeer at.....	136	—, Railways of.....	113
—, Pupils of public schools at.....	144	—, Telegraph system of.....	112
—, Residence of Congregational minister at.....	147	Curry, J. L. M., Obituary notice of.....	117
Capital Mountain, Height of.....	399	Curtis, W. E.; Great Turk and his lost provinces.....	45
Carabao in Philippines, Importance to natives of.....	198	—, Book on Macedonia by.....	473
—, Importations of.....	197		
—, Hatred of white men by.....	200	Dalny, Building of.....	360
—, Plague among.....	197	Darling, C. H., cited on Polar exploration.....	431
Caracas, University at.....	21	—, Correspondence with Peary.....	380
—, View of.....	19	—, Tribute to.....	433
Carbons, Largest ever found.....	443	Darton, N. H., referred to.....	116
—, Production of.....	452	Davidson, James W., Book on Formosa by.....	468
Carleton, M. A., Acknowledgment to.....	181	Davies, H. I., cited on Cuban development.....	112
Carnegie Institution, Grants.....	82	Davis, W. M., Expedition to Turkestan by.....	215
—, Chinese expedition of.....	292	Dawson, Yukon Territory, Winter freighting to.....	100
—, Turkestan expedition of.....	215	Day, David T., referred to.....	263, 292, 334, 452
Carpenter, Frank G., Book on Europe by.....	43	—, Record of address by.....	44
Caribbean Sea, Handbook for navigation of.....	117	Dean, Bashford, Report on Japanese oyster culture	
Carter, C. F., Book on California by.....	121	by.....	122
Catalpa, Hardy.....	348	Deep sea soundings.....	67
Castilla rubber tree.....	409	Del Bosque, Fernando, Texan expedition of.....	339
Catawba grape, Discovery of.....	445	Denmark, Refusal by, to sell West Indian posses-	
—, Value of.....	450	sion.....	39
Census Office, Acknowledgment to.....	175	Department of Agriculture, See Agriculture.....	
Chamberlin, T. C., cited on earth's origin.....	425	Department of Commerce and Labor.....	166
Champ, W. S., Acknowledgment to.....	414	Dewey, Admiral, Chart made by.....	61
—, member of Ziegler Polar expedition.....	251	Diamond-cutting industry in the United States.....	454
Charcot, Jean, Arctic expedition of.....	217	Diamond trust.....	452, 458
—, Antarctic expedition of.....	296	Diamonds, World's production of.....	452

	Page		Page
Diller, J. S., Report on Crater Lake by.....	83	Geographic text-books; C. A. McMurry's Special	
Draga, Queen of Servia.....	59	Method in.....	473
Du Chaillu, Paul, cited on reindeer feeding.....	137	— — —; W. H. Olm's Commercial Geography.....	122
—, Obituary notice of.....	282	— — —; Tarr and F. McMurry's Complete Geog-	
—, Portrait of.....	283	raphy.....	299
Dunn, R. S., Mount Wrangell explorations by.....	408	— — —; Trotter's Geography of Commerce.....	426
—, Attempt to ascend Mount McKinley.....	297, 425	Geographic influences on American history, Brigh-	
Dye, Eva E., Book on Lewis and Clarke by.....	121	ham's book on.....	473
		— — —, Semple's book on.....	473
Easter, S. E.; Jade.....	9	Geographic Names, Decisions of Board on.....	82, 258
Eckel, E. C., referred to.....	216	Geographical Society of Baltimore, Officers of.....	392
Eddy, W. A., Kite experiments by.....	220	Geographical Society of California, Officers of.....	393
Edson, John Joy, referred to.....	292, 390	Geographical Society of Chicago, Officers of.....	393
Edward VII, arbitrator Argentina-Chile bound-		Geographical Society of Lisbon.....	296
ary.....	115	Geographical Society of New York.....	118
Egretious English, The.....	122	—, Officers of.....	390
Egypt, Irrigation of.....	99	Geographical Society of the Pacific, Officers of.....	393
Emerson, Harrington; Opening of Alaska.....	40	— referred to.....	118, 255
Emmons, S. F., referred to.....	216	Geographic Society, National, Annual excursion	
Emory, Frederick, Acknowledgment to.....	158	of.....	217
England, <i>See</i> United Kingdom.....		— appoints representative to China.....	293
Evans, A. M., referred to.....	218	— — — on Ziegler Polar expedition.....	251, 123
Europe, Frank G. Carpenter's book on.....	43	— By-laws of.....	297
		— Flag of.....	297
Fairchild, H. L., Book on geology by.....	425	— Committee on Election of President.....	254
Faris, Mount, View of.....	98	— endorses proposition to bring Smithsonian's body	
Farming scenes in the United States.....	181, 265, 266	to America.....	255
— — — Philippines.....	199, 200, 202, 206	— Election of chairman of Geographic Congress,	
Fenneman, N. M.; Report on lakes of southeastern		McGee.....	
Wisconsin.....	122	— Election of Secretary O. P. Austin.....	425
Fernow, B. E., Book on forestry by.....	22	— Excursion Committee of.....	217
Fiala, Anthony, Commander Ziegler Polar expe-		— Meetings of.....	44, 84, 123, 428, 474
dition.....	251	— Membership list of.....	45
—, Letter to Ziegler from.....	414	— New home of.....	217, 428
—, Portrait of.....	414	— Officers of.....	394
Fish Commission, Publications by.....	297, 118, 122	— referred to.....	1, 29, 61, 117, 217, 218, 254, 361
Fisher, A. K., referred to.....	199	— Resignation of chairman Geographic Congress	
Fisher, Joseph, Book on Norsemen by.....	122	Committee, A. W. Greely.....	254
Flinders Petrie, W. M., Excavations at Abydos.....	358	— — — President Alexander Graham Bell.....	254
Flood scenes.....	286, 288	— — — Secretary A. J. Henry.....	425
Floods of 1903 in United States.....	285	—, Work of, in connection with Geographic Con-	
Florida, Palmettos of.....	174	gress.....	292, 388
Forbes, R. H., cited on Colorado River.....	78	Geographical Society, Royal, Award of Gill mem-	
Forestry, Bureau of. <i>See</i> Bureau of Forestry.....		orial by.....	217
—, Economics of.....	122	—, referred to.....	13, 164
—, European methods of.....	384	—, South Polar expedition of.....	210
—, Influence of, on lumber industry.....		Geography, Erroneous theories concerning.....	432
Forests of Canada.....	106	Geological Survey, Appalachian stream measure-	
—, White pine, of Michigan.....	175	ments by.....	167
Formosa, Davidson's book on.....	468	—, Division of Alaskan mineral resources.....	425
Foster, John W., Book on American diplomacy in		—, Division of Hydrology.....	116
the Orient.....	121, 259	—, Economic work of.....	215
—, Canadian boundary.....	85	—, Explorations in Alaska of.....	255, 257, 400
—, Counsel for United States in Alaskan Boundary		—, Hydrographic work of.....	39, 78, 116
dispute.....	116	—, Irrigation work of.....	165
Fountain, Paul, Book on mountains and forests of		—, Publications by.....	80, 83, 116, 118, 122, 168, 216, 391
South America.....	122	—, Report on diamonds by.....	452
France, Manufactures of.....	313	—, Topographic maps by.....	41, 79, 116, 118, 168, 216
Frankenfield, H. C.; The Weather Bureau and the		—, Tribute to.....	336
recent floods.....	285	Geology, Elements of; Joseph Le Conte.....	425
Fruits, American exports of.....	36	Gerdeau, Captain, cited on destruction of Brazil	
Fuller, M. L., referred to.....	116	rubber forests.....	413
		Gerdine, T. G., Alaskan explorations of... 161, 255, 398	
Gallatin, Albert, Urges establishment of Coast		Germany, Cause of Denmark's refusal to sell her	
Survey.....	2	West Indian possessions.....	39
Gannett, Henry, Surveys of Muir Glacier by.....	445	—, Coal production of.....	315
—, Work on Philippine census by.....	390	—, Copper production of.....	318
Gaumer, Dr.; Report on sisal hemp.....	157	—, Manufactures of.....	313
Geelmuyden, Prof., Acknowledgment to.....	417	—, Steel and iron production of.....	317
Geographic Congress, International, Organization		Gilbert, G. K., Acknowledgment to.....	174
of.....	254, 292	—, Book on physical geography by.....	21
—, Plans of.....	388	—, Note on Muir Glacier.....	444
Geographic education at Cornell University.....	295	—, referred to.....	244, 254
— — — University of Chicago.....	163	—, Report of, as Chairman of Research Committee	
Geographic text-books; Gilbert and Brigham's		of National Geographic Society on scientific work	
Physical Geography.....	21	of Ziegler Polar expedition.....	252
— — —; C. A. McMurry's Teachers' Manual.....	298	Gilbert, J. J., Discovers Raleigh Rock.....	148
— — —; C. A. McMurry's General Method.....	222	—, Work in Philippines of.....	439
		Goode, J. P., Work of.....	164
		Goode, Richard U., Obituary notice of.....	424

	Page		Page
Goode, Richard U., Portrait of.....	424	Hovey, E. O., cited on new cone of Mont Pelée.....	422
Grand Canyon of the Colorado, Character of.....	163	—, Expedition to Mont Pelée by.....	118, 422
—, Rock edges and waste slopes of.....	24	Howard, L. O., Locust fungus supplied by.....	197
—, Survey of.....	162	Howe, C. D., Forestry work of.....	213
Great Lakes, Mean annual rainfall of.....	328	Hubbard, F. Tracy, Kite picture by.....	231
Grape industry of United States.....	445	Hubbard Memorial Hall.....	217, 428
—, Pictures of.....	446-450	Huggins, P. Foster, cited on St Vincent eruption.....	158
Greece, Richardson's book on.....	472	Huntington, Ellsworth, Awarded Gill memorial.....	217
Greely, A. W., referred to.....	252	—, Expedition to Turkestan.....	217
—, Report of, for 1903.....	467	Hulbert, A. B., Book on Redmen's Roads.....	122
—, Resigns chairmanship Committee on International Geographic Congress.....	254	Hurricanes, Report on, by Wm. H. Alexander.....	44
—, Work in Alaska of.....	467	Husmann, Geo. C., Report on U. S. grape industry.....	450
—, Work in Philippines of.....	468	Hydrographic Office, Branch offices of.....	68
—, Work in Cuba of.....	112	—, Charts constructed by.....	64
Grosvenor, Edwin A.; Review of Foster's American diplomacy in Orient.....	259	—, Deep sea soundings by.....	67
Grosvenor, Gilbert H.; American development of the Philippines.....	197	—, Derelicts destroyed by.....	73
—; Appendix of seventy illustrations of kites and structures used by Alexander Graham Bell.....	231	—, Foreign surveys by.....	63
—; Benguet, the garden of the Philippines.....	203	—, History of.....	61
—, Book reviews by.....	21, 42, 43, 83, 119, 120, 217, 298, 299, 425-427, 468-474	—, Organization of.....	61
—; British South Polar expedition.....	210	—, Pilot charts issued by.....	69
—; Conquest of bubonic plague in the Philippines.....	185	—, Publications by.....	67, 117
—; Geographic notes.....	26, 29, 35, 39, 40, 78-82, 109-118, 162-168, 197, 213-217, 254, 292-297, 320, 348, 353, 359, 386-391, 408, 422, 424, 425, 497	—, Tribute to.....	74
—; Grape-growing industry in the United States.....	445	Igorrotes of Philippines.....	206
—; Notes on Panama and Colombia.....	458	India, Commerce of.....	83
—; Paul du Chaillu.....	282	Ingram, A. E., referred to.....	296
—; Peary and the North Pole.....	379	Insular Affairs, Bureau of, Publications by.....	112
—; Precious stones.....	451	Irrigation, Importance of underground waters to.....	39
—; Reindeer in Alaska.....	127	— in Egypt.....	40
—; Rubber plantations in Mexico and Central America.....	409	— plans in five states.....	165
—; Some notes on Venezuela.....	17	Insanity, Geographic distribution of, in United States.....	361
—; Suggested field for exploration.....	290	— in cities and towns.....	367
Guatemala, Maps of.....	82	— among colored.....	376
—, Volcanic disturbances in.....	291, 390	Jack, G., Forestry work of.....	213
Guillemot eggs.....	387	Jackson, Sheldon, Acknowledgment to.....	138, 148
Hall, William L., Report on hardy catalpa by.....	348	—, Expedition to Lapland by.....	145
Hamilton, William, Acknowledgment to.....	138, 148	—, Imports reindeer from Siberia.....	127
Harbors of the United States.....	173	—, Official reports by.....	148
—, Types of.....	176	—, Urges introduction of reindeer into Alaska from Siberia.....	131
Hardy catalpa, Geographic distribution of.....	349	Jade, Aztec reverence for.....	16
—, Plantation of.....	350	—, Chinese uses of.....	15
—, Qualities of.....	351	—, Discovery of implements in Europe of.....	11
—, Report on, by W. L. Hall.....	348	—, Distribution of.....	9
—, Wood of, after lying 90 years in water.....	351	—, from New Zealand.....	457
Hargrave, Laurence, Kite experiments by.....	220	—, Mines of, in Chinese Turkestan.....	12
Harriman Expedition, referred to.....	445	—, Museums of.....	16
Hassler, Professor, presents plan for Coast Survey.....	2	Jaggat, T. A., referred to.....	291
Hayes, C. Willard, Alaskan explorations by.....	396	Japan, Bacon's book on women of.....	121
—, cited on economic work of Geological Survey.....	215	—, Brownell's book on.....	473
—, referred to.....	216	—, Copper production of.....	318
Heilprin, Angelo, Book on Mont Pelée and Martinique.....	121, 167, 291	—, Oyster culture in.....	122
—, cited on Mont Pelée.....	167, 291	Jarvis, D. H., Mountain named in honor of.....	162, 399
Henequen (Yucatan fiber), Cultivation of.....	150, 157	—, Point Barrow Relief Expedition by.....	145
—, See agave, sisal hemp.		Jewish cemetery in Bosnia.....	49
Henry, A. J., Report on wind velocity and water-level of Lake Erie.....	116	Jefferson, Thomas, Urges founding Coast and Geodetic Survey.....	1
—, Resignation as Secretary of the National Geographic Society.....	425	Johnson, W. D., Acknowledgment to.....	179
Herring fisheries, Report of H. M. Smith on.....	117	Johnston, Sir Harry, Book on Uganda by.....	42
Herron, J. S., Alaskan explorations of.....	30	Kansas, Field of watermelons in.....	170
High plains, Reclamation of.....	81	—, High plains of.....	178
Hill, George W., referred to.....	120	Kassaroof, Madam, Bulgarian philanthropist.....	52
Hill, Robert T., Acknowledgment to.....	461	Keith, Arthur, Work in Utah by.....	168
—, Geologic work of.....	297	Kennan, George, Book on Tragedy of Pelée.....	119
—, Photographs by.....	461	Keyser, L. S., Book on Birds of the Rockies.....	121
—, referred to.....	291	King, Clarence, Book on Mountaineering in Sierra Nevada.....	121
Himalayas, Workmans' ascents in the.....	420	Kirchhoff, C.; The United States, her mineral resources.....	331
Holder, Charles F.; Big things of the West.....	279	Kite construction with Hargrave rectangular cell.....	221
Hollick, A., Explorations in Alaska.....	255	— — — Bell triangular cell.....	223
Holmes, E. S., Acknowledgment to.....	266	— — — tetrahedral cell.....	224
Hovey, E. O., cited on St Vincent eruptions.....	158	Kite experiments by Alexander Graham Bell.....	219
		— — — W. A. Eddy.....	220
		— — — Laurence Hargrave.....	220

# INDEX

479

	Page		Page
Kite experiments by C. F. Marvin.....	220	Meacham, F. R., Checks bubonic plague.....	185
— — — A. L. Rotch .....	220	Meakin, Annette M. B., Book on Siberian Yailway.....	43
— — — U. S. Weather Bureau .....	220	Melville, Admiral, referred to.....	252
Kite flying by Chinese, Japanese, and Malays.....	220	Mendenhall, W. C.; Explorations among Wrangell Mountains.....	405
Kites, Bell aerodrome.....	228	—, Report by, on Alaskan work.....	300
—, Bell floating.....	230	—; Wrangell Mountains, Alaska.....	395
—, Bell miscellaneous.....	242, 243, 244, 245	Men-of-war, Surveys by.....	63
—, Bell multicellular giant.....	233	Merriam, C. Hart, cited on Alaska.....	91
—, Bell non-capsizable.....	239	— — — Timberline.....	114
—, Bell paddle-wheel.....	247	—, referred to.....	119, 252
—, Bell polygonal.....	246	Merrill, Frederick J. H., New York State geologic map by.....	218
—, Bell tetrahedral boat.....	237, 238	Meunier, Stanislas, cited on volcanic action.....	110
—, Bell tetrahedral cell.....	226, 294	Mexico, Tour in, Book by Mrs. James Edwin Morris.....	122
—, Bell triangular box.....	222	Mexico, Unknown, Book by Carl Lumholtz.....	121, 298
—, Hargrave rectangular box.....	221	Michigan Topographic maps of.....	41
Kodak developing machine.....	216	—, White pine forests of.....	175
Kunz, Geo. F., Report on precious stones by.....	452	Missouri, Floods of the.....	285
Labrador, Report of Brown Harvard Expedition to.....	82	Mississippi, Floods of.....	285
Lake Erie, Rainfall and level of.....	327	Monroe doctrine.....	39
—, Testing the currents of.....	41	Mont Pelée, Heilprin's book on.....	121, 167, 291
Lake Linderman, Winter freighting on .....	103	—, Hovey's account of.....	422
Lake Ontario, Traveling beach on shore of.....	26	—, Kennan's book on.....	119
Land grant colleges.....	36	—, New cone and spine of.....	167, 422
Langhorne, Report on Dalny by.....	260	—, referred to.....	272, 291
Langley, S. P., cited on flying machine.....	229	Moore, Willis L., referred to.....	252, 254
Lansing, Robert, referred to.....	116	—, See Weather Bureau.	
Leighton, W. O., Report on pollution of streams.....	80	Moseley, E. L.; Rainfall and level of Lake Erie.....	327
Lewis and Clarke Expedition, Mrs Dye's book on.....	121	—; Testing the currents of Lake Erie.....	42
Lindgren, W., referred to.....	216	Mossman, R. C., cited on Antarctica.....	162
Lippincott, T. B., Work in California.....	78, 80	Mount Blackburn, Height of.....	162, 399
Lloyd's tribute to Hydrographic Office.....	74	Mount Drum, Height of.....	162, 399
Logging methods in United States.....	382	—, Picture of.....	401
London, Highways and byways of.....	122	Mount Everest, Plans for ascent of.....	164
Loubat prizes of Columbia University.....	40	Mount Gordon, Height of.....	399
Lucas, F. A.; Animals before man in America.....	43	Mount Hood, View of.....	177
Luebkert, Otto J., member National Geographic Society Excursion Committee.....	217	Mount Jarvis, Height of.....	162, 399
Lumbering in Europe.....	384	Mount McKinley, Attempted ascent of.....	297, 425
Lumholtz, Carl; Book on Unknown Mexico .....	121, 298	—, Map of.....	32
Macedonia, Lawlessness in.....	56	—, Plans for climbing.....	30
McCormick, J. H., Secretary Geographic Congress.....	292, 390	Mount Keag, Height of.....	162, 399
McCurdy, A. W., inventor kodak developing machine.....	216	Mount Sanford, Height of.....	162, 399
—, referred to.....	294	Mount Sorata, Miss Peck's attempted ascent of.....	425
McCurdy, David George, Kite pictures by.....	241	Mount Wrangell, Height of.....	162, 399
McGee, W. J., Book reviews by.....	299, 300	—, Picture of.....	397
—elected chairman Geographic Congress Committee.....	254, 292	Mount Zanetti, Height of.....	399
—, referred to.....	44, 390	Mountain climbing, World's records in.....	421
McMurry, C. A., Book on "General Geography Teaching".....	192	Muir Glacier in 1903; C. L. Andrews.....	441
—, "Teacher's Manual of Geography".....	298	— — —; G. K. Gilbert.....	444
—, referred to.....	295	— — —, Map of.....	444
McMurry, Frank M., "Complete Geography" by.....	299	— — —, Panorama of.....	442, 443
McNeil, Angus, Book on "Egregions English".....	122	— — —, Recent recession of.....	444
Magnetic declination tables.....	121	Muir, John, Surveys of Muir Glacier by.....	444
Mahlo, Alaskan explorations by.....	398, 405	Muldrow, Robert, Alaskan surveys of.....	39
Mammoth found in Texas.....	359	Murdoch, L. H.; Why Great Salt Lake has fallen.....	75
Mango, Character of.....	322		
— fork.....	326	Naval officers, Charts made by.....	64
— fruit, showing method of packing.....	324	Negritos of Philippines.....	209
— — — peeling.....	326	Nelson, E. W., referred to.....	119
— grove.....	321	Nery, Santa-Anna, Book on Brazil.....	43
—, History of.....	325	Newcomb, Simon, cited on flying machine.....	226
—, Introduction of, into United States.....	320	Newell, F. H., Acknowledgment to.....	180
— of Porto Rico.....	320	New York city, Geologic map of.....	216
Manila, Botanical gardens of.....	197	New York State, Geologic map of.....	216, 218
—, Chinese labor in.....	197	—, Grape industry of.....	450
—, Cholera scenes in.....	188, 192	—, Physical geography of (Tarr).....	121
—, Improvements in.....	195	—, Topographic maps of.....	41, 168
Maracaibo, Port of.....	20	New Zealand, Jade from.....	457
Markham, Clements R., cited on Polar exploration.....	432	—, White population of.....	360
Markham, Edward M., Work in the Philippines by.....	418	Nile, Subduing the.....	49
Marlott, C. L., cited on San José scale.....	168	Niukluk River, Freight boat on.....	104
Marvin, C. F., Kite experiments by.....	220	Nome, Landing at.....	100
Mathes, F. E., Explorations of Grand Canyon by.....	162	Nome region.....	105
Maury, Hydrographic work of.....	62	Nordenskjöld, Otto, Antarctic expedition of.....	206
Mazamas, Outing of, for 1903.....	168	Nor-emen in America.....	122
— Officers.....	394	North Atlantic Ocean, Pilot chart.....	45
		North Magnetic Pole, Amundsen's expedition to.....	293
		—, Ross' determination of.....	294
		North Polar routes.....	430



	Page
North Polar expeditions. <i>See</i> Peary, Ziegler, Arctic.	
— exploration, Value of.....	429
North Pole, Conquest of, a business proposition.....	435
—, Moral prestige of gaining.....	436
Ohio, Grape industry of.....	445
Ohio River floods.....	285
Olcott, George N., Judge Loubat prizes.....	40
Oregon, Grain fleet of.....	271
—, Sand dunes of.....	25
—, Sheep of.....	180
—, Wheat stacks of.....	269
Oyster culture in Japan.....	122
Pacific, Problems of.....	117
—, Question of, Pezet's book on.....	121
Palmer, T. S., referred to.....	119
Palmettos of Florida.....	174
Panama Canal.....	459
Panama city, History of.....	458
—, Population of.....	462
—, Scenes of.....	461, 464
Panama, Republic of, Aborigines of.....	466
—, Area of.....	458
—, Climate of.....	462
—, Commerce of.....	462
—, Notes on.....	458
—, Population of.....	462
—, Scenes of.....	464, 466
Paraguay, Book on.....	83
Partsch, J., Book on Central Europe by.....	473
Patagonia, H. Hesketh Pritchard's book on.....	300
Patterson, Prof., Suggests need of Coast Survey.....	1
Peary Arctic Club, Organization of.....	434
—, Tribute to Peary by.....	330
Peary, Robert E.; Asserts Pole is attainable.....	29
—, Elected President American Geographical Society.....	118
—, Letter to Assistant Secretary Darling by.....	379
—, Map showing sledge routes and surveys of.....	28, 330
—, Plans for next expedition of.....	379, 430
—, Record of addresses to National Geographic Society by.....	29, 429
—, Tribute from Peary Arctic Club to.....	330
—, Tribute from President Roosevelt to.....	381
—, Value of Arctic exploration.....	429
Peck, Annie S., Unsuccessful attempt to ascend Sorata.....	425
Perkins, E. T., Work in California.....	78
Peru-Chile boundary dispute.....	121
Peters, W. J., Alaskan explorations of.....	398
—, Appointed National Geographic Society Representative on Ziegler Polar Expedition.....	251
—, Presented with National Geographic Society flag.....	297
—, Portrait of.....	414
Petroff, Ivan, cited on Alaska.....	91
Pezet, F. A., Book on Peru-Chile boundary.....	121
Philippine Commission, List of reports by.....	210
Philippine Islands, Agricultural opportunities in.....	197, 203
—, American development of.....	197
—, Blair and Robinson's series on.....	426, 473
—, Board of Health of.....	194
—, Bubonic plague conquered in.....	185
—, Carabaos of.....	198
—, Census of.....	390
—, Chinese labor in.....	197
—, Coast line of.....	441
—, Cholera in.....	185, 195
—, Farming scenes in.....	198, 207
—, Garden of (Benguet).....	203
—, Gazetteer of.....	112
—, Igorrotes of.....	206
—, Map of.....	118
—, Mining Bureau of.....	418
—, Non-Christian tribes of.....	208
—, Official reports relating to.....	210

	Page
Philippine Islands, Pygmies of (Negritos).....	209
—, Surveying.....	434
—, Telegraph system of.....	408
Phillip, John W., Chart made by.....	64
Physical Geography, Gilbert and Brigham's.....	21
Pig iron production of the world.....	317
Pilot charts.....	69
— chart of North Atlantic Ocean.....	45, 70
Pinchot, Gifford, Forestry work of ( <i>See</i> Bureau of Forestry).....	115
Plant Industry, Bureau of, Work of.....	36, 320, 408
Pogromni Volcano, Description of.....	95
—, View of.....	98
Point Barrow gardening.....	355
— relief expedition.....	145
Porter, Russell W., member Ziegler Polar Expedition.....	252
Portland, Oregon, Views of.....	177, 271
Porto Rico, Coast Survey work in.....	8
—, Commerce of, with United States.....	294
—, Mangoes of.....	320
—, Rubber plantations for.....	309
Pratt, J. F., Alaskan work of.....	468
Precious stones, Production of.....	45
Price, Overton W.; Influence of forestry on lumber industry.....	381
Pritchard, H. Hesketh. Book on Patagonia by.....	300
Prindle, L. M., Alaskan explorations by.....	255
Provincetown, Mass., Checking sand dunes at.....	25
Pumpelly, Raphael, Expedition to Turkestan by.....	215
Putnam, George R.; Surveying the Philippines.....	437
—, Tribute to.....	9
Railroads and forestry.....	328
Railways, Canada.....	214
—, United States.....	319
—, Pratt's book on.....	472
—, World.....	319
Raisin consumption of England.....	451
— — United States.....	451
— production of California.....	447
— — United States.....	445
Raleigh Rock, Discovery of.....	148
—, Picture of.....	148
Ransome, F. L., Report on Globe copper district.....	80
Rats, Carriers of bubonic plague.....	186
—, Extinction of, in Manila.....	187
Reaburn, D. L.; Plan for climbing Mount McKinley.....	30
Reclamation in California.....	78
— Colorado.....	166
— Wyoming.....	166
— of high plains.....	81
— service, Projects of.....	165
Redmen's Roads, Book by A. B. Hulbert.....	122
Reeves, W. P., cited on white population of British colonies.....	360
Reid, H. R., Surveys of Muir Glacier by.....	442
Reindeer express.....	102, 137
— feeding.....	142
— from Lapland.....	142
— from Siberia.....	127
—, Importance of, to Alaskan mission stations.....	141
— industry in Alaska.....	126
— — —, Future of.....	147
— — —, Bibliography of.....	148
— loaned by United States Government.....	141
— pictures.....	126-141
— stations in Alaska.....	131
Ridgway, R., referred to.....	119
Riggs, Oregon, overwhelmed by sand dunes.....	25
Roberts, Chalmers, cited on Egyptian irrigation.....	40
Rock carved by rain.....	23
Rohn, Oscar, Alaskan explorations by.....	396
Roosevelt, President, compliments Peary.....	381
—, Tribute to, by Peary.....	431
— urges importance of agricultural education.....	38
Rose, T. N., cited on mangoes.....	327
Rossel, M. A., cited on volcanic action.....	110
Rotch, A. L., Kite experiments by.....	220

# INDEX

481

	Page		Page
Rotch, A. L., referred to.....	292	Stone, Helen, Kidnapping of.....	58
Roth, Filibert, Forestry work of.....	313	—, Work in Bulgaria of.....	52
Rubber forests, Destruction of.....	413	Stubbs, W. J., cited on mangoes.....	425
Rubber gathering, Views illustrating.....	408	Sumatra tobacco grown in United States.....	35
Rubber plantations in Mexico and Central America.....	409	Sven Hedin, Portrait of.....	27
Rubber protection, French school for.....	414	—, Publications of.....	473
Rubber trees, Assam.....	409		
—, Castilla.....	409		
—, Para.....	409	Taft, W. H., cited on agricultural wealth of Philip-	
Rubber, Value of United States imports of.....	409	—, pines.....	197
—, World's supply of.....	409	—, cited on Benguet.....	203
Rubies, Origin of.....	452	Tarr, R. S.; Book on Complete Geography.....	299
Russell, I. C., referred to.....	291	—, Physical Geography, New York State.....	121
—; Timberlines.....	80, 114	—, referred to.....	295
Russell, Mark, Alaskan explorations by.....	398	Tea, American.....	36
Russian River, California.....	23	Tetrahedral cell, Virtues of.....	225
		—, kites (See A. G. Bell, kites).....	226-247,
		—, principle in kite construction; Alexander Gra-	294
		ham Bell.....	218
Sailing directions.....	67	Texas, Expedition of Del Bosque into.....	339
Salisbury, R. D., Geographic work by.....	163	—, Imperial mammoth found in.....	388
Salmon fisheries of Alaska.....	118	Thompson, E. H.; Henequen, the Yucatan fiber.....	150
Salt Lake City, Annual precipitation at.....	75, 114	Tibet, Climate of.....	354
—, Great, Why it has fallen.....	75, 114	—, Customs of people of.....	354
Sand dunes, Massachusetts.....	25	—, Dalai Lama of.....	355
—, Oregon.....	25	—, Explorations in, by Zoubikov.....	353
Sandusky Bay, Currents of.....	41	—, Population of.....	354
San José scale.....	168	—, Sven Hedin's book on.....	473
Schlichter, C. S., Report on underground waters.....	39	Timberlines.....	80, 114
Schrader, F. C., Alaskan explorations of.....	255, 398	Tittmann, O. H., Acknowledgment to.....	91, 468
Schwatka, F., Alaskan Explorations of.....	396	—, Record of address by.....	44
Scidmore, E. R., Book on Winter India by.....	473	—, referred to.....	95, 252
Scott, Captain, English Antarctic Expedition.....	210	—, Work of U. S. Coast and Geodetic Survey.....	1
Seattle-Sitka cable.....	468	See Coast and Geodetic Survey	
Sequoias, Views of giant.....	383, 385	Trotter, Spencer; Book on Geography of Com-	
Servia, Rulers of.....	58	—, merce.....	426
Seward Peninsula.....	105	Trans-Canadian Railway.....	214
Shattuck, G. B., referred to.....	213, 292	Triangular cell in kite construction.....	222
Shishaldin Volcano, Description of.....	91	Tsetse-Flies, Monograph on.....	473
—, Views of.....	93, 94, 97	Turk and His Lost Provinces; W. E. Curtis.....	45
Siberian reindeer owners.....	140, 143	Turkestan, Jade mines of.....	12
Siberian Railway.....	43	—, Pumpelly expedition to.....	215
Sierra Club, Officers of.....	394		
—, Outing of.....	168	Uganda, Book on; Sir Harry Johnston's.....	42
Sierra Nevada, Mountaineering in.....	121	Ulrich, K. O., referred to.....	216
Signal Corps work in Alaska.....	467	Underground waters.....	39
—, Cuba.....	112	Unimak Island, Map of.....	92
—, Philippines.....	439, 468	—, Mountains on.....	94
Sisal hemp, Cultivation of.....	150	Unimak Pass, View of Pogromni, Faris, and West-	
—, See Agave, Henequen.		dahl peaks from.....	98
Sitka-Seattle cable.....	468	United Kingdom, Coal production of.....	315, 316
Sloan, Wm. M., Judge Loubat prizes.....	40	—, Manufactures of.....	313, 314
Smith, G. O., referred to.....	216	—, Pig iron production in.....	317
Smith, Hugh M.; Report on herring fisheries.....	117	—, Steel production in.....	317
Smith, Middleton; Gardening in northern Alaska.....	355	United States an agricultural community.....	268
Smith, W. S. T., referred to.....	216	—, Agricultural products of.....	271, 38
Smithson, James, Life of.....	111	—, Agriculture, Persons engaged in.....	305
—, Movement to bring body of, to America.....	111	—, Birds of.....	119
—, — endorsed by National Geographic Society.....	255	—, Climate of, Diversity of.....	172
—, — — Geographical Society of Pacific.....	255	—, Coal production of.....	315
Snider Peak, Height of.....	399	—, Coastal plains of.....	177
Sofia, Capital of Bulgaria.....	54	—, Coast line of.....	441
—, Scenes in.....	57	—, Copper production of, compared with other	
Soil, Different kinds of.....	264	—, countries.....	318
—, Origin of.....	263	—, Cotton production of.....	120, 318
Soils, Bureau of, Work of.....	37	—, Farming scenes.....	180, 266-281
Soufrière of St Vincent, Eruption in 1812.....	158	—, Food supply of—Equal to increasing population.....	277
—, referred to.....	212	—, Foreign commerce of.....	359
South Africa, Diamonds from.....	454	—, Geographic distribution of insanity in.....	361
—, White population of.....	360	—, Geographic position of.....	172
South America, T. C. Dawson's book on.....	471	—, Grape, wine, and raisin production of.....	445
—, Mountains and forests of.....	122	—, Great valley and plateaus of.....	178
Southerland, W. H. H., Work of U. S. Hydrographic		—, Harbors of.....	173
Office.....	61	—, Immigration of, in 1903.....	391
Spain, Copper production of.....	318	—, Internal commerce of.....	166
Spencer, Alaskan explorations by.....	255	—, Lumber industry of.....	351
Spurr, J. E., Referred to.....	316	—, Magnetic tables of.....	121
Stambuloff, Stefan, Character of.....	54	—, Manufactures of.....	313, 304
—, Murder of.....	56	—, —, Exported.....	306
Stanford, Leland, Vineyards of.....	451	—, —, Imported.....	307
Steel production of the world.....	317		
Stein, M. A., Referred to.....	12		

	Page		Page
United States, Manufactures of, Persons employed in.....	305	Weyster, G. M., Acknowledgment to.....	177
—, Miles of railway of.....	319	Wheat, Improved varieties of.....	166
—, Mineral resources of.....	331	White, William A.; Geographical distribution of insanity in United States.....	361
—, Mountains of.....	179	White Pass Railway.....	101
—, Number of farm animals of.....	276	— population of the chief British colonies.....	360
—, Number of farms of.....	275	Whynper, Exploration in Canadian Rockies.....	116
—, Precious stones of.....	452	Wigmore, H. L., Work in the Philippines of.....	418
—, — in, Production of.....	451	Wilkes, Commander Charles, Antarctic explorations by.....	218
—, Population, Density of.....	171	— Land, Account of.....	218
—, Railroad development in.....	184	Willis, Bailey, Acknowledgment to.....	170
—, Rainfall of.....	181	—, Expedition to China.....	293
—, Scenery of.....	170	Wilson, James, Report of, as Secretary of Agriculture.....	35
—, Steel production of.....	317	Wine production of European nations.....	451
—, Survey of coast of.....	7	— — United States.....	451
—, Underground waters of.....	39	Wisconsin, Lakes of.....	122
University of Chicago, Geographic department of.....	163	—, Topographic maps of.....	41
Valdés, Port of.....	102, 368	Witherspoon, D. C., Alaskan exploration of.....	161, 255, 398
Vanderlip, W. B., Book on Siberian Klondike.....	471	Workman, Mrs F. B., Record ascents in Himalayas by.....	420
Venezuela, Area of.....	19	—, Wm. B., Record ascents in Himalayas by.....	420
—, Climate of.....	19	Worcester, Dean C., cited on agriculture in Philippines.....	201
—, Commerce of.....	21	—, Report of.....	185
—, Discovery of, by de Ojeda.....	17	Wrangell Mountains, Character of.....	399
—, Geographical relation of, to Isthmian routes.....	18	—, Explorations of.....	161, 395
Vermeule, C. C., referred to.....	218	—, Feasible routes for ascent of.....	402
Vineyards, Largest of United States and Europe.....	451	—, Heights of.....	162, 399
Volcanic action, Theories of.....	110	—, Glaciers of.....	406
— disturbances in America.....	291	—, Panorama of.....	395
Volcanoes, Bogoslof.....	95	Wright, George Frederick, Book on "Asiatic Russia".....	121
—, Colima.....	290	—, Surveys of Muir Glacier by.....	445
—, Mont Pelée.....	119, 167, 290, 422	Young, T. M., Book on the American cotton industry.....	120
—, Pogromni.....	95, 98	Yucatan, Ancient civilization of.....	150
—, Santa Maria.....	290, 390	— Fiber (sisal hemp).....	150
—, Shishaldin.....	91, 93	—, People of.....	150
—, Souffrière, St Vincent.....	158, 290	—, Prosperity of.....	158
—, Wrangell.....	397	Yukon country, Development of.....	99
Ward, R. D., Book on climatology by.....	473	Ziegler Polar expedition.....	414, 82
Washington, Wapitus Lake and Dutch Miller Pass.....	170	—, Departure of.....	417
Watermelons, Field of.....	178, 179	—, Members of.....	253
Waters, Underground, amount of.....	39	—, Plans of work of.....	254
—, Importance to irrigation of.....	39	—, Portraits of officers of.....	414
—, Motion of.....	39	—, Some dogs of.....	415
Watkins Glen, a gorge carved from bed of shale.....	22	—, Steamer of.....	415
Weather Bureau, and the recent floods.....	285	Ziegler, William, and the National Geographic Society.....	251
—, Kite experiments of.....	220	Zoubikov, G. Z., Explorations in Tibet by.....	353
—, referred to.....	75, 447		
—, Report on West Indian hurricanes by.....	44		
—, Scottish Antarctic Expedition assisted by.....	162		
—, Stations of, on Great Lakes.....	327		
—, Work of, during 1902.....	37		
—, —, on Lake Erie.....	116, 327		
Weddell, James, Explorations by.....	162		
Weddell Sea, exploration of.....	162		
Weed, W. H., referred to.....	216		
West, Big things of the.....	279		
Westdahl, Ferdinand; Mountains on Unimak Island, Alaska.....	94		
— Peak, Description of.....	95		
—, View of.....	98		

## Errata.

For Howard read Harvard, p. 82, l. 27, 1st col.  
For parallels read meridians, p. 414, l. 14, 2d col.; also  
p. 416, l. 9, 2d col.

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# CONTENTS

	Page
The Work of the U. S. Coast and Geodetic Survey; by O. H. TITTMANN.....	1
Jade; by S. E. EASTER .....	9
Notes on Venezuela .....	17
An Introduction to Physical Geography.....	21
Dr Sven Hedin .....	26
Peary on the North Pole .....	29
Plan for Climbing Mount McKinley; by ALFRED H. BROOKS and D. L. REABURN.....	30
What the United States Government Does to Promote Agriculture.....	35
Geographic Notes.....	39
Is Germany the Cause of Denmark's Refusal to Sell Her West Indian Possessions?..	39
The Amount of Water Hidden Beneath the Surface.....	39
Loubat Prizes.....	40
Subduing the Nile .....	40
Government Maps Recently Issued.....	41
Testing the Currents of Lake Erie; by E. L. MOSELEY.....	41
Geographic Literature .....	42
"The Uganda Protectorate" (Sir Harry Johnston).....	42
"Animals Before Man in America" (F. A. Lucas).....	43
"Europe" (Frank G. Carpenter).....	43
"A Ribbon of Iron" (Annette M. B. Meakin).....	43
"The Land of the Amazons" (Baron de Santa Anna Nery) .....	43
"Strange Lands Near Home" .....	43
"Hurricanes" (William H. Alexander).....	44
National Geographic Society.....	44
Members of the National Geographic Society.....	Appendix
The Great Turk and His Lost Provinces; by WILLIAM E. CURTIS ...	45
The Work of the U. S. Hydrographic Office; by W. H. H. SOUTHERLAND.....	61
Why Great Salt Lake Has Fallen; by L. H. MURDOCH.....	75
Geographic Notes.....	77
American Claims in the Antarctic; by EDWIN SWIFT BALCH.....	77
Reclamation of Arid Lands in California.....	78
Alaskan Boundary Dispute .....	79
Recent Maps and Publications by the U. S. Geological Survey.....	79
Timber Lines .....	80
Reclamation of the High Plains .....	81
Commander Robert E. Peary .....	81
The Magnetic Work of the U. S. Coast and Geodetic Survey.....	81
Ziegler North Polar Expedition.....	82
Maps of Guatemala .....	82
The Carnegie Institution Grants .....	82
Report of the Brown-Harvard Expedition to Labrador in 1900.....	82
Decisions of the U. S. Board on Geographic Names.....	82
Geographic Literature.....	83
"Crater Lake National Park" (J. S. Diller).....	83
"Commercial India in 1902" (Bureau of Statistics).....	83

	Page
List and Catalogue of U. S. Coast and Geodetic Survey Publications.....	83
"Paraguay".....	83
National Geographic Society.....	84
The Canadian Boundary; by JOHN W. FOSTER.....	85
Mountains on Unimak Island, Alaska; by FERDINAND WESTDAHL.....	91
Opening of the Alaskan Territory; by HARRINGTON EMERSON.....	99
The Forests of Canada.....	106
Work in the Far South.....	109
Theories of Volcanic Action.....	110
Geographic Notes.....	111
The Founder of the Smithsonian Institution.....	111
Gazetteer of the Philippines.....	112
The Development of Cuba.....	112
Timberline; by C. HART MERRIAM.....	114
Bureau of Forestry.....	115
Argentina-Chile Boundary Award.....	115
The Alaskan Boundary Dispute.....	116
Wind Velocity and Fluctuations of Water Level on Lake Erie.....	116
The Pittsburg Coal District.....	116
The Alaska Frontier, by T. W. BALCH.....	116
Division of Hydrology of the U. S. Geological Survey.....	116
Herring Fisheries.....	117
Navigation of the Gulf of Mexico and the Caribbean Sea.....	117
Alaskan Boundary Dispute.....	117
Dr J. L. M. Curry.....	117
Proceedings of the Section of Geology and Geography of the American Association for the Advancement of Science.....	117
Hon. O. P. Austin.....	117
Map Sheets of New York State.....	118
Map of the Philippines.....	118
Disturbances in the West Indies.....	118
S. A. Andr��e.....	118
Geographical Society of the Pacific.....	118
Salmon and Salmon Fisheries of Alaska.....	118
Fishing in the South Sea Islands.....	118
American Geographical Society.....	118
Geographic Literature.....	119
"Handbook of Birds of the Western United States" (Florence Merriam Bailey).....	119
"The Tragedy of Pel��e" (George Kennan).....	119
"The American Cotton Industry" (T. M. Young).....	120
"Year-Book of the Department of Agriculture 1901".....	120
Books Received.....	121
"Japanese Oyster Culture" (Bashford Dean).....	122
Publications by the U. S. Geological Survey.....	122
Appalachian Forest Reserve.....	123
By-Laws of the National Geographic Society.....	123
Reindeer in Alaska; by GILBERT H. GROSVENOR.....	127
Raleigh Rock.....	148
Henequen—The Yucatan Fiber; by E. H. THOMPSON.....	150
A Report of the Eruption of the Soufriere of St Vincent, 1812; from the Evening News of June 30, 1812.....	158

# GONTENTS

V

	Page
Geographic Notes.....	161
Explorations Among the Wrangell Mountains, Alaska.....	161
Scottish Antarctic Expedition.....	162
Survey of the Grand Canyon.....	162
Geography in the University of Chicago.....	163
The Ascent of Mt Everest.....	164
Irrigation Plans in Five States.....	165
Internal Commerce of the United States.....	166
Reclamation in Wyoming and Colorado.....	166
Department of Commerce and Labor.....	166
The Possibilities of Southern Appalachian Streams.....	167
Mont Pelée.....	167
The Census of China.....	167
The San Jose Scale.....	168
The Outing of the Mazamas.....	168
Bingham, Utah, Mining District... ..	168
A Map of the Dairy Region of New York State.....	168
The United States—Land and Waters ; by CYRUS C. ADAMS.....	171
The Conquest of Bubonic Plague in the Philippines.....	185
Improvements in the City of Manila.....	195
American Development of the Philippines.....	197
Benguet—The Garden of the Philippines.....	203
The British South Polar Expedition.....	210
Geographic Notes.....	213
Bureau of Forestry.....	213
The New Trans-Canada Railway.....	214
Expedition to Turkestan.....	215
Geological Survey.....	215
Geological History of New York City.....	216
The Kodak Developing Machine.....	216
National Geographic Society.....	217
Annual Excursion of the National Geographic Society.....	217
Dr Jean Charcot .. ..	217
The Gill Memorial Award.....	217
Geographic Literature.....	217
"Antarctica" (Edwin Swift Balch).....	217
Geologic Map of New York State.....	218
The Tetrahedral Principle in Kite Structure ; by ALEXANDER GRAHAM BELL.....	219
Appendix of Seventy Illustrations of Kites and Structures used by Alexander Graham Bell.....	231
Notes on the Preceding Illustrations ; by ALEXANDER GRAHAM BELL.....	248
Mr Ziegler and the National Geographic Society.....	251
Geographic Notes.....	254
National Geographic Society.....	254
Alaskan Surveys, 1903... ..	255
Gold Discoveries in Alaska.....	257
Decisions of the U. S. Board on Geographic Names.....	258
Geographic Literature.....	259
"American Diplomacy in the Orient" (John W. Foster).....	259
Mapping of the Brazilian Territory.....	262
The United States ; Its Soils and Their Products ; by H. W. WILEY.....	263

# VI THE NATIONAL GEOGRAPHIC MAGAZINE

	Page
Big Things of the West; by CHARLES F. HOLDER.....	279
Paul du Chaillu .....	282
The Weather Bureau and the Recent Floods; by H. C. FRANKENFIELD.....	285
A Suggested Field for Exploration.....	290
International Geographic Congress.....	292
Geographic Notes.....	292
Geological Exploration in Eastern Asia .....	292
The Norwegian Expedition to the Magnetic North Pole by Roald Amundsen. ....	293
The Tetrahedral Kite.....	294
Porto Rico and the United States.....	294
Summer School of Geology and Geography at Cornell University.....	295
The Swedish South Polar Expedition.....	296
The Geographical Society of Lisbon.....	296
German South Polar Expedition .....	296
The National Geographic Society's Flag.....	297
Sven Hedin's Publications.....	297
The Arctic Club.....	297
Robert T. Hill.....	297
The Reproductive Period in the Lobster.....	297
The Alaskan Boundary Dispute .....	297
The Ascent of Mount McKinley .....	297
Geographic Literature.....	298
"A Teacher's Manual of Geography" (Charles McMurry) .....	298
"The Alaska Frontier" (Thomas Willing Balch).....	298
"Unknown Mexico" (Carl Lumholtz).....	298
"Complete Geography" (Ralph S. Tarr and Frank M. McMurry).....	299
"Through the Heart of Patagonia" (H. Hesketh Pritchard).....	300
U. S. Geological Survey Publications on Alaska.....	300
The United States—Her Industries; by O. P. AUSTIN.....	301
The Introduction of the Mango .....	320
Rainfall and the Level of Lake Erie; by E. L. MOSELEY.....	327
Geographic Notes .....	328
The Railroads and Forestry.....	328
The Peary Arctic Club Map.....	330
The United States—Her Mineral Resources; by C. KIRCHHOFF.....	331
Expedition into Texas of Fernando del Bosque; by BETTY B. BREWSTER.....	339
The Hardy Catalpa.....	348
Explorations in Tibet.....	353
Gardening in Northern Alaska; by MIDDLETON SMITH .....	355
Excavations at Abydos .....	358
Geographic Notes.....	359
Foreign Commerce of the United States in 1903 .....	359
White Population of the Chief British Colonies .....	360
The Building of Dalny.....	360
The Geographical Distribution of Insanity in the United States; by WILLIAM A. WHITE.....	361
Peary and the North Pole .....	379
The Influence of Forestry upon the Lumber Industry of the United States; by OVERTON W. PRICE .....	381
Geographic Notes .....	386
Guillemot Eggs.....	386

# CONTENTS

VII

	Page
Skull of the Imperial Mammoth .....	388
Eighth International Geographic Congress.....	388
Philippine Census.....	390
Guatemalan Volcanic Disturbances.....	390
Immigration into the United States.....	391
U. S. Geological Survey Publications.....	391
A North Polar Expedition.....	391
The Ascent of Mt Sorata.....	391
Directory of Officers and Councillors of Geographic Societies of the United States.....	392
The Wrangell Mountains, Alaska; by WALTER C. MENDENHALL.....	395
Rubber Plantations in Mexico and Central America.....	409
The Ziegler Polar Expedition.....	414
The Mining Bureau of the Philippine Islands; by CHARLES H. BURRITT.....	418
Record Ascents in the Himalayas.....	420
The New Cone of Mont Pelée.....	422
Alaskan Boundary Decision.....	423
Richard Urquhart Goode.....	424
National Geographic Society.....	425
Unsuccessful Ascent of Mount McKinley and Mount Sorata.....	425
U. S. Geological Survey.....	425
Geographic Literature.....	425
"Elements of Geology" (Joseph Le Conte).....	425
"Geography of Commerce" (Spencer Trotter).....	426
"The Philippine Islands, 1493-1803" (Edited by Emma Helen Blair and James A. Robertson).....	426
"The Training of Wild Animals" (Frank C. Bostock).....	427
"Texas" (George P. Garrison).....	427
Program of Meetings of National Geographic Society, 1903-1904.....	428
The Value of Arctic Exploration; by Commander ROBERT E. PEARY.....	429
Surveying the Philippine Islands; by GEORGE R. PUTNAM.....	437
Muir Glacier; by C. L. ANDREWS.....	441
Note on Muir Glacier; by G. K. GILBERT.....	444
The Grape-Growing Industry of the United States.....	445
Precious Stones.....	451
Notes on Panama and Colombia.....	458
The U. S. Signal Corps.....	467
Geographic Literature.....	468
"The Island of Formosa" (James W. Davidson).....	468
"The South American Republics" (Thos. C. Dawson).....	471
"In Search of a Siberian Klondike" (Washington B. Vanderlip).....	472
Books Received.....	472
Recent Publications of the U. S. Government.....	474
National Geographic Society.....	474



## LIST OF ILLUSTRATIONS

	Page
Map showing site of the Chinese Jade mines.....	12
Map of eastern Turkestan .....	13
Map showing geographical relation of Venezuela to the Isthmian Canal routes.....	18
A view of Caracas.....	19
The Port of Maracaibo.....	20
The University—Caracas.....	21
Watkins Glen; a gorge carved from beds of shale.....	22
A pebbly rock carved by rain; Russian River, California.....	23
Rock edges and waste slopes, Grand Canyon of the Colorado River, Arizona.....	24
The last house in Riggs, Oregon, a village overwhelmed by dunes.....	25
Planting grass to stop the drifting of sand, near Provincetown, Cape Cod, Mass.....	25
A traveling beach on the shore of Lake Ontario .....	26
Dr Sven Hedin in his study, Stockholm.....	27
Outline map of Peary's sledge routes and surveys.....	28
Map of Mt McKinley region, Alaska.....	32
Pilot chart of the North Atlantic Ocean (22 x 32 inches) .....	Supplement
A Jewish cemetery, Bosnia.....	49
Government hotels, Bosnia.....	50
The ancient Greek Monastery of St John of Ryle, Bulgaria.....	53
Sofia, the capital of Bulgaria.....	54
House of the Sobranye (Bulgarian National Assembly), Sofia.....	57
Prince Ferdinand of Bulgaria.....	58
King Alexander of Servia.....	59
Map showing different Alaskan boundary lines claimed by United States and Canada.....	90
Outline map of Unimak Island .....	92
Shishaldin from anchorage just west of Pinnacles.....	93
View of Shishaldin from near Pankof.....	94
View of Shishaldin from west side of Otter Cove.....	97
View of Pogromni, Faris, and Westdahl peaks from Unimak Pass .....	98
Winter freighting overland, Dawson, Yukon Territory .....	100
Landing through the surf at Nome.....	100
Hauling the United States mail with reindeer, Nome, Alaska .....	102
Winter freighting on the ice, Lake Linderman.....	103
Freight boat on the Niukluk River—carries 7 tons.....	104
Map showing stations of the four South Polar expeditions .....	108
Diagram showing the railways of Cuba.....	113
Chart showing annual precipitation at Salt Lake City and water level of Great Salt Lake.....	114
Herd of reindeer crossing a river in Siberia .....	Frontispiece
Reindeer on the Siberian beach waiting to be loaded on the <i>Bear</i> .....	128
Reindeer herd, Siberia.....	129
Unloading reindeer, St Lawrence Island, Alaska .....	130
Outline map showing government reindeer stations in Alaska.....	131
Mr T. L. Brevig starting on a family sleigh ride, Teller reindeer station.....	132
Traveling with reindeer in summer.....	133
Breaking a path through deep snow.....	134
Milking reindeer, Teller reindeer station.....	135

# LIST OF ILLUSTRATIONS

IX

	Page
Freighting with reindeer, Cape Prince of Wales .....	136
Traveling deerback through deep snow .....	137
Riding in summer .....	138
Reindeer tethered during a halt .....	139
A Siberian woman and daughter .....	140
Lieutenant Bertholf mounted on a reindeer, showing the ability of the reindeer to carry 210 pounds .....	141
Reindeer digging up the snow to get the moss beneath .....	142
A Siberian, the owner of 10,000 head of reindeer, and a Cossack official .....	143
Pupils of public school, Cape Prince of Wales, 1902 .....	144
Residence of Congregational missionary, Cape Prince of Wales, Alaska .....	147
Raleigh rock .....	148
Sheldon Jackson, I.L. D .....	149
A wild variety of agave found in the deep forests of Yucatan .....	151
A field of young sisal plants—two years old .....	152
A native in the interior cleaning the fiber by the ancient method .....	153
Tresses of the sisal fiber cleaned by the <i>paché</i> ; native implements for cleaning fiber .....	154
Drying sisal fiber at one of the large plantations—Yucatan .....	155
Bales of sisal fiber ready for shipment .....	156
Wapitus Lake and Dutch Miller Pass, Washington .....	Frontispiece
Among the palmettos of Florida .....	174
In the white pine forests of Michigan .....	175
Portland, Oregon, Mt Hood in the distance .....	177
On the high plains, western Kansas .....	178
A field of watermelons, western Kansas .....	179
A band of 2,000 sheep grazing on the mountain slopes, Oregon .....	180
Combined harvester-thresher on one of the vast wheat fields of the West .....	181
Map showing navigable rivers of the United States .....	183
Typical cholera house, over filthy open drain, Manila .....	188
Typical native water-closets .....	189
A typical cholera center .....	190
Farola district after burning of infected buildings .....	191
Native market, showing "shacks" backing up against filthy open drain .....	192
Divisoria market .....	193
Board of health for the Philippine Islands and presidents of provincial board of health .....	194
Street work, carried on by Filipinos under American inspectors .....	196
Carretón or freight cart drawn by a "carabao" .....	198
Harrowing a field for rice .....	199
Stacking rice .....	200
Primitive Agriculture. Tagbantia women harvesting rice, Calaminanes Islands .....	202
Igorrote climbing a tree fern, Benguet .....	204
In the pines, Benguet .....	205
The Igorrote town of Cabayan, Benguet, Luzon .....	206
Igorrote rice terraces, Cabayan, Benguet, Luzon .....	207
A chief of the Gaddanes, Isabela, Luzon .....	208
Adult Negrito woman, showing relative size .....	209
Map showing route of new Trans-Canadian railway .....	214
Hargrave box kite .....	221
Triangular box kite .....	222
Compound triangular kite .....	223
Winged tetrahedral cells .....	224

	Page
Tetrahedral frames. ....	225
Four-celled tetrahedral kite. ....	226
Sixteen-celled tetrahedral kite. ....	226
Tetrahedral kites. ....	227
The aerodrome kite. ....	228
The aerodrome kite just rising into the air when pulled by a horse. ....	229
Aerodrome kite in the air. ....	230
Floating kite. ....	230
Body of multicellular giant kite; triangular box kite. ....	232
Different views of a multicellular giant kite. ....	233
Multicellular giant kite rising in the air. ....	234
Building a windbrake of tetrahedral cells. ....	235
A completed windbrake showing method of use. ....	236
Observation house; views of a winged boat. ....	237
Views of a tetrahedral winged boat. ....	238
Views of a non-capsizable kite. ....	239
Views illustrating mode of studying behavior of bodies in the air. ....	240
Views illustrating experiments with kites formed of open tetrahedral cells. ....	241
Views illustrating experiments to determine relation of center of gravity to center of surface in flying structures. ....	242
Views illustrating experiments with varying arrangement of cells. ....	243
Views illustrating experiments with varying number of cells. ....	244
Views of a multicellular kite having six sets of cells and of a giant kite having three twelve-sided cells. ....	245
Views of a hexagonal kite and a twelve-sided kite. ....	246
Views of a paddlewheel kite. ....	247
Prospecting for gold in Alaska with reindeer as pack animal. ....	256
John W. Foster. ....	260
A steam plow in the great valley of California. ....	265
Front view of a steam harvester-thrasher used on the Pacific coast. ....	266
Rear view of steam harvester-thrasher. ....	267
Between the walls of 100,000 sacks of wheat at Mission, Oregon. ....	269
Sacked wheat awaiting shipment. ....	270
A portion of the grain fleet in Portland Harbor, Oregon. ....	271
Thrashing rice with a steam thrasher in southwestern Louisiana. ....	273
Harvesting rice in southwestern Louisiana. ....	274
A field of pumpkins grown for seed. ....	276
A field of silverskin onions on Bloomsdale farm, Philadelphia. ....	277
Cattle being fattened for export. ....	278
A colossal Californian pumpkin. ....	280
A giant Californian potato vine. ....	281
Paul du Chaillu. ....	283
Flood scene, Marion, Ark., March, 1903. ....	286
Camps of negro refugees, flood of March, 1903. ....	288
Tetrahedral kite in the air. ....	294
Diagram showing value of manufactures in the United States, 1810-1900. ....	303
Diagram showing increase in value of manufactures, 1810-1900. ....	304
Diagram showing value of manufactures <i>per capita</i> , 1810-1900. ....	304
Diagram showing value of manufactures in United States, 1810-1900. ....	303
Diagram showing increase in value of manufactures, 1810-1840, and in each decade from 1840-1900. ....	304
Diagram showing value of manufactures <i>per capita</i> , 1810-1900. ....	304

# LIST OF ILLUSTRATIONS

XI

	Page
Diagram showing number of persons in each 1,000 engaged in manufacturing and agriculture, 1870-1900.....	305
Diagram showing total number of persons engaged in manufactures and agriculture, respectively, 1870-1900.....	305
Diagram showing value of products of manufacture and agriculture, respectively, 1870-1900.....	306
Diagram showing value of manufactures exported, 1800-1902.....	306
Diagram showing per cent which manufactures formed of imports and exports, 1820-1902.....	307
Diagram showing distribution of exports of manufactures in 1901.....	308
Diagram showing value of manufacturers' raw material imported and per cent which it formed of total imports, 1820-1902.....	309
Diagram showing relative value of manufacturers' material and all other importations, 1890-1902.....	309
Diagram showing growth of exports of domestic products and share which manufactures formed of that total, 1870-1901.....	310
Diagram showing total value of manufactures exported, 1870-1901, and the share which iron and steel formed of that total.....	311
Diagram showing exports of manufactures of iron and steel, 1870-1901.....	311
Diagram showing progress in the principal manufacturing industries, 1870-1901.....	312
Diagram showing value of manufactures in France, Germany, United Kingdom, and United States, 1840, 1860, 1888, 1894.....	313
Diagram showing growth of manufactures in France, Germany, United Kingdom, and United States, 1840-1894.....	314
Diagram showing coal production of Germany, United Kingdom, and United States, 1875-1901.....	315
Diagram showing relative growth in coal production in Germany, the United Kingdom, the United States, and all other countries, 1870-1901.....	316
Diagram showing pig-iron production of Germany, United Kingdom, and United States, 1877-1901.....	317
Diagram showing steel production of Germany, United Kingdom, and the United States, 1877-1901.....	317
Diagram showing copper production of Germany, Spain, Japan, and the United States, 1883-1901.....	318
Diagram showing cotton production of the world, 1902.....	318
Diagram showing miles of railway in the United States and Europe, 1850, 1870, 1880, 1902.....	319
Grove of mango trees, between Cabo Rojo and Joyua, P. R. ....	321
Branch of mango tree with fruit, Tapachula, Mexico.....	323
Mango fruit, showing method of packing.....	324
Mango fork (full size).....	326
Mango fruit, showing method of peeling (natural size).....	326
Congratulatory letter to Robert E. Peary from Peary Arctic Club. Map.....	330
Posts from the planting of 1890, Yaggy plantation.....	349
Trees which were not cut back when young—planting of 1891.....	350
Wood of the hardy Catalpa after lying ninety years in water.....	351
A twenty-year old plantation of hardy Catalpa, southern Iowa.....	352
Outline map showing ratio of total insane per 100,000 population, Census 1880.....	362
Outline map showing number population for each insane person, Census 1880.....	363
Outline map showing location of cities having a population of 50,000 or more, Census 1890.....	367
Outline map showing ratio of total insane per 100,000 population, Census 1890.....	368
Outline map showing white insane only, Census 1880.....	375
Outline map showing number colored population for each colored insane, Census 1880.....	376
The cross-section of a Giant Sequoia.....	383
The stump of a Giant Sequoia.....	385

	Page
Guillemot eggs—St Paul Island, Pribiloff group..	387
Skull and tusks of the imperial mammoth discovered in the sands of western Texas .....	389
Panorama of the Wrangell Mountains ( $4\frac{1}{2} \times 42$ inches).....	Frontispiece
Mount Wrangell.....	397
Mount Drum .....	401
Snider's Peak, as seen from the west.....	404
A plantation of Castilla rubber trees .....	408
A native tapping a Castilla rubber tree.....	410
Native method of coagulating the milk of the rubber tree (4 figures).....	411
Clusters of ripe fruit of the Castilla rubber tree .....	412
Members of the Ziegler Polar Expedition.....	414
Some of the dogs of the Ziegler Polar Expedition .....	415
A deck scene on the <i>Amerika</i> .....	415
S. S. <i>Amerika</i> of the Ziegler Polar Expedition.....	416
Embarking the Siberian ponies at Solombala, Siberia .....	417
The new spine of Mont Pelée from the basin of the Lac des Palmistes .....	422
The top of the new spine of Mont Pelée from the crater rim.....	423
Richard Urquhart Goode. ....	424
Surveying party crossing a river on an improvised raft.....	437
Landing from an outrigger through the surf.....	438
U. S. Coast and Geodetic steamer <i>Pathfinder</i> .....	439
Triangulation party starting out from Manila .....	440
A. Panoramic view of Muir Glacier in May, 1903. ....	442
B. Panoramic view of Muir Glacier in May, 1903. ....	443
Sketch map of Muir Inlet and front of Muir Glacier, showing positions of the ice front in 1890 and in May, 1903....	444
Picking grapes in California .....	446
Picking raisin grapes in California .....	447
Drying seedless raisins in California.....	448
Stemming raisins in California.....	449
Packing raisins in layers in California.....	450
The largest piece of carbon ever found. Actual size.....	453
Process of breaking the carbon.....	454
Carbon shown on opposite page as finally broken into pieces for drills.....	455
Diamond sawing.....	456
An uncompleted section of the Panama Canal.....	459
Canal cutting through massive basaltic rock.....	459
Panama Bay: The Island of Tobago, famous for its delicious pineapples.....	460
Washerwomen, Isthmus of Panama.....	460
Panama: Interior of ruins of old cathedral.....	461
Panama: This tower alone remains to mark the site of the great city of the sixteenth century.....	461
A street of Colon.....	463
Colon: Driveway of Christofer Colon, the canal suburb.....	463
Colon: Residence of the superintendent of the Panama Railway Company at the entrance of Limon Bay.....	465
Panama Bay: The Island of Naos, terminus of the Pacific mail line.....	465
Houses of the Talamancan Indians.....	467
Typical vegetation of the Isthmus of Panama .....	467
Landing on Botel Tobago.....	469
Scenes on the island of Botel Tobago, Formosa .....	471



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